IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication OCTOBER 27, 1960

★ Carrier Researchers Study the Problem:

Is Industry Meeting Its Water Needs? p. 55

Report on GE Strike Tactics p. 58

Make Stainless Strip Flatter p. 89

Digest of the Week p. 2-3

Using basic components, seven different arrangements are possible, as shown above. Spindle drive motors can be mounted at right, left, or on both sides with single or double spindles; two machines can be placed side-by-side or used with other production machines.

The 4 BIG Features of Ex-Cell-O's New 411 Vertical Are Important To You

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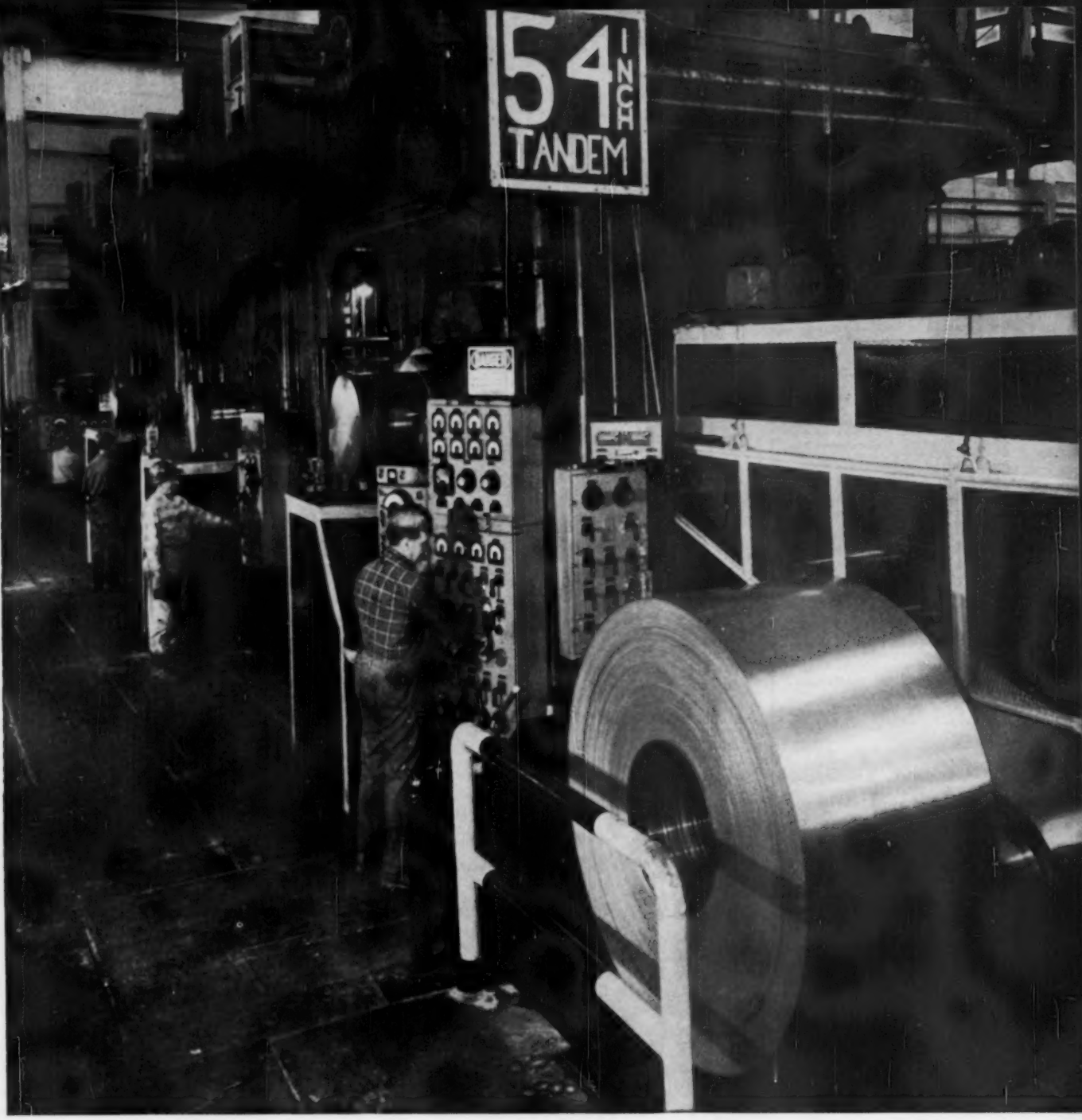

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The IRON AGE

October 27, 1960—Vol. 186, No 17

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News of the Industry

GE's LABOR TACTICS

The Acid Test—GE's labor tactics have proved successful. More than likely, other companies will

try to adopt them. But the tactics call for more than just taking a strong stand. P. 58

WASHINGTON

Political Impact—The results of two government studies will be released after the Presidential election. One says government should stay out of steel labor negotiations; the other claims a 5 pct growth rate is unnormal and taxing. P. 60

MAGNESIUM MARKETS

Looking for Volume—A new source of metal, and new techniques lowering piece costs are expected to push magnesium in big volume markets, such as the automotive industry. P. 61

ASM METAL SHOW

Competition Stressed — New

Metalworking

products and processes aimed at increased productivity and higher quality products ruled at the show. Space and electronics market draws interest to metalworkers. P. 62

RESEARCH ABROAD

Right Environment — Many American companies are opening research labs in Europe. One reason is that it gives European scientists an atmosphere better suited for their work and living. P. 63

Engineering-Production Developments

COATED-ABRASIVE BELTS

Flatten Stainless Strip—Crown is a real bottleneck on most strip finishing lines. It's impossible to "pressure out" this metal buildup. Abrasive-belt machines in tandem, grinding in oil, remove the crown from stainless steel strip up to 28 in. wide. These grinders remove imperfections, produce good finishes and hold close tolerances—in a single pass. P. 89

TAPE-CONTROLLED UNIT

Drills, Reams, Taps, Bores—At a major jobbing shop, a tape-controlled machine tool handles short runs and prototype parts. It programs a given tool to varying levels and varying tool depths—without operator attention. P. 92

MOLY REFERENCE BLOCKS

Improve Sonic Testing—Checking billets against possible flaws will guarantee a sound end product. But any ultrasonic test depends upon a set of standards. One company redesigned its reference blocks to offer higher quality. Result is a threefold increase in sensitivity with molybdenum blocks. P. 94

POWER SHAFTS

Pose Question—How straight is straight? There are many degrees of straightness. However, new standards are needed. Proposed is a new basic term: Total Indicator Reading. P. 96

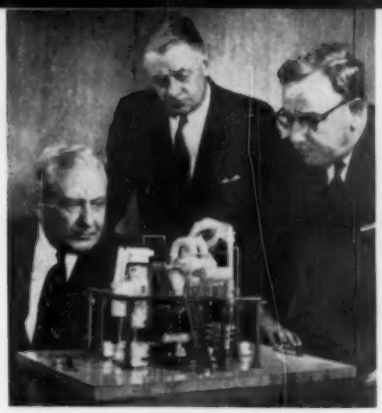
FIRE-PREVENTION PLAN

Pays-Off—Fire can create havoc in any large factory. If operations are widespread, protection and prevention problems multiply. Fire makes the rules: You have to fight on its own terms. P. 100

Market and Price Trends

AUTOMOTIVE

Malleable Usage — More and more malleable iron is being used by automakers. And this is happening during a time when the move is for new materials. The chief reason is weight. P. 68



Cover Feature

WATER RESEARCH — Carrier Corp. officials study model of plant to make fresh water from the sea. Left to right are Cloud Wampler, board chairman, William Bynum, president, and Dr. J. F. Downie Smith, vice-president, R&D. P. 55

MACHINE TOOLS

Satellite Station — New rotary machine has a final machining station off the dial. The satellite arrangement allowed design of a smaller machine with fewer fixtures at a lower cost. P. 75

STEEL SUMMARY

More Setbacks—November steel business will be down from October. Cutbacks in automotive tonnage are the big factor in the gloomy outlook. December is not likely to be much better. This means that any real improvement in steel production is now set back into 1961 as current orders lag behind expectations. P. 125

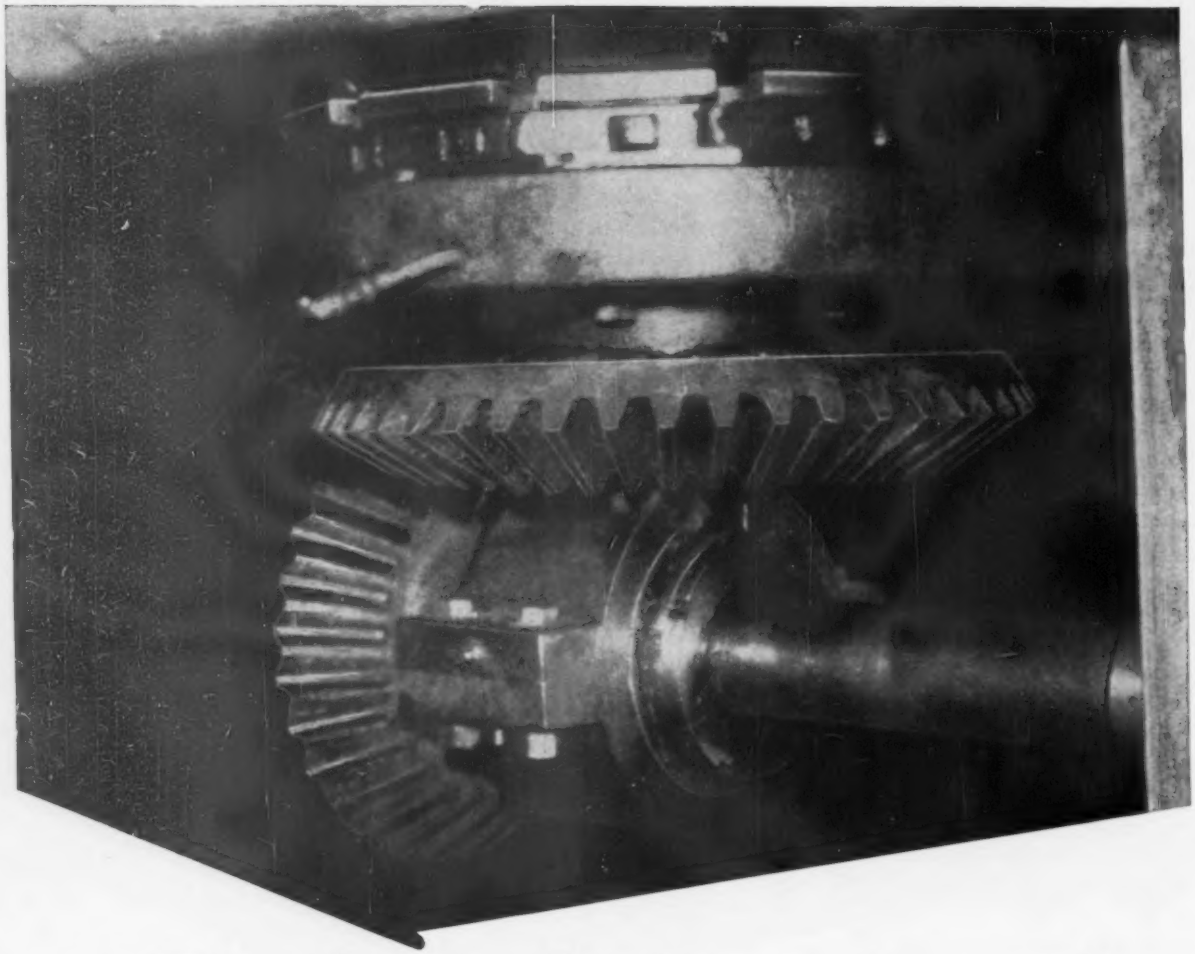
PURCHASING

A New Method—The scale industry is realizing increased sales. Largely responsible for this is a new method of selling a "system" with the scale as the heart of it. Deliveries are prompt. P. 125

NEXT WEEK

ELECTROSHAPE PROCESS

Dissolves Surface Atoms—Electroshaping uses electrical energy to dislodge a metal's surface atoms with no gouging action. The dissolving solution sweeps these atoms away at metal removal rates of 0.05-0.1 inch per minute.



a Bearings, Inc. conversion with a 2 year record of no lost production, reduced maintenance . . . and a 30% Power Savings!

Over two years ago our engineers converted this main drive gear from a babbitt bearing to a ball bearing unit on a machine in a customer's plant. Performance of this conversion, according to company engineers, has been outstanding! The housing for the bearings as well as the gear hub was produced by the customer in their own machine shop.

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America's Basic Strength: Is There Really a Weakening?

America's basic strength is not alone in its arms, its missiles, or its productive capacity. You will find it in its heart; in its ideals. And you will find it in its enthusiasm to have others share what we believe to be our good fortune.

There are those who do not believe this. They will point to delinquencies, to prejudices. They will cite our so-called soft living. Perhaps these are part of us. But they are a small part of the whole.

Love of country and pride of home do not mean one is a naive pollyanna. Nor do they mean that one with such convictions is ignorant of such things as international problems, global decisions, or the threat of future chaos.

In checking ourselves, it is fair to repeat that we are not a dictatorship. We covet no other nation nor anything in that nation. We have no imperialistic aims. Our people are not overbearing nor do they practice a national snobbery.

America has its faults of omissions. We have our civil rights problems, which are being solved. We have our shortcomings as has every nation since the dawn of history. We have our crooks, our charlatans, our selfish louts, our lost souls. But who hasn't?

If you talk to our youth and mix with them, the laboratory-like social studies don't always stack up with the living figures. If you mingle with the elders and listen to their hopes and their gripes and feel their courage, you are not afraid for this nation.

If you talk with workers and let them unwind by listening, you are not fearful of our future. And if you visit our executives with their hair down, you will see they are not distraught. They have not given up hope and they do not tremble at the future.

Often molders of opinion have reneged on their homework. Some of their dire predictions and admonitions may have been written in the ivory tower. They do not have a monopoly on the ability to see, to read, to interpret, and to heed history. Probably the majority of our people —who are busy making our nation the great country it is—have this ability too.

We have the leaders, the heritage, and the challenge. With this combination, we should be indestructible.

Tom Campbell

Editor-in-Chief

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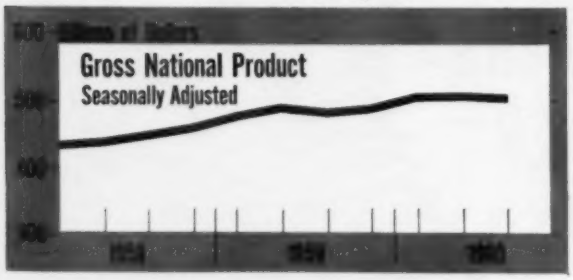
GNP Ends 2½-Year Climb

Is the third quarter drop in Gross National Product an indicator of a long period of business decline? While a big drop in the GNP is not likely, there are some bearish factors in the drop from the second



quarter rate of $505 billion (seasonally adjusted annual rate) to $503 billion.

For one thing, except for the steel strike period last year, it is the first decline since the first quarter of 1958. Secondly, a big factor is a drop in consumer spending, with a $2 billion decline in the rate of spending for consumer durables.

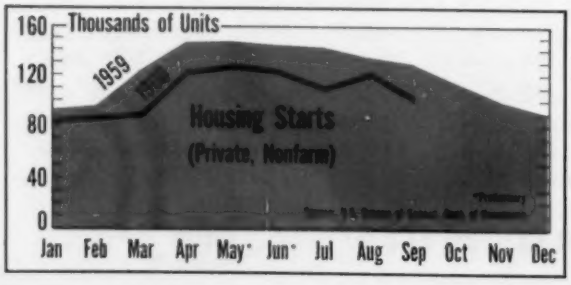
"Mild" Recession for Metalworking

A squeeze on profits, a further decline in production, and the most rugged competition in recent years spell "correction" for industry, predicts Tom Campbell, editor-in-chief of The IRON AGE.

Speaking at the annual meeting of the American Society for Metals, Mr. Campbell said that a severe national recession has not yet been indicated, although he concedes a "mild" recession in metalworking. "It will be some time next year, perhaps by the end of spring or early summer, when we should watch the figures for a strong upturn," Mr. Campbell said.

Homes Drop, Upturn Not in Sight

As predicted, the August upturn in new home starts turned out to be a false start. New home projects (private, nonfarm) launched in September dropped 21



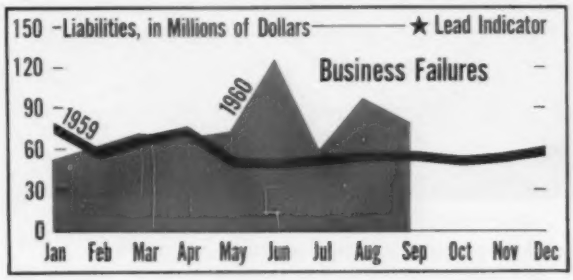
pct from the September rate to only 95,700. This is at a seasonally adjusted annual rate of 1.054 million. Easier money can help the housing market, but it won't take effect for some time. Building permits issued in September indicate an even lower rate of new home starts in October.

Tool and Die Orders Lowest Since '58

Another bearish indicator is the falloff of orders among tool and diemakers. Part of the low state is seasonal, with tooling for the 1961 cars out of the way. The National Tool & Die Manufacturers Assn. reports that August orders were the lowest since November, 1958, with the outlook for fall and winter shipments gloomy. Backlogs of orders are also at the lowest point since November, 1958.

Business Failures Dip Seasonally

The up-and-down character of the rate of business failures continues to conceal a pattern in what is con-

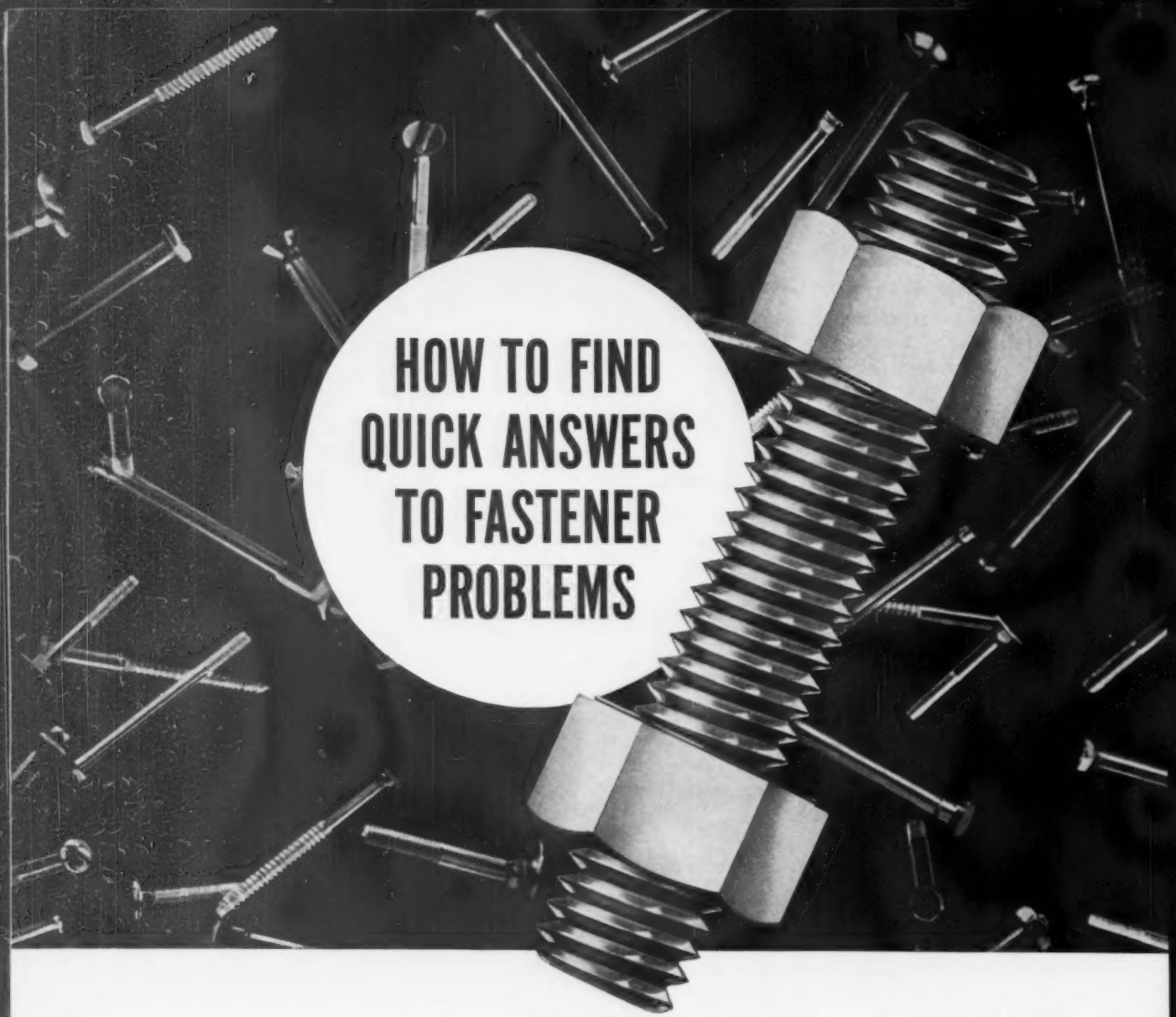


sidered to be a lead indicator. Failures and liabilities declined seasonally in September, according to Dun & Bradstreet, but the level continues above the year-ago rate. Dollar liabilities for the month totaled $80.6 million. Failures totaled 1269 for the month.

Capital Investment Shows Returns

Third quarter reports show that earnings are falling off sharply for many industries. The urge for most companies will be to hold onto their diminished cash flow, but there is a strong tendency for many companies not to curtail their capital spending plans. There are good reasons. Money is easier. And fast service and possible bargains make this a good time for capital investment.

Some indications of the steel industry's return on previous capital spending are apparent in third quarter returns. Many of the companies were able to turn a small profit on less than 50 pct operations.



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ILWA: Automation Pays

There's a new way to buy automation. International Longshoremen's and Warehousemen's Union will receive $31.5 million over the next six years from the Pacific Maritime Assoc. In return, ILWA agrees to the introduction of labor-saving machinery on West Coast docks.

The unique agreement to cover the effects of automation is the result of nearly three years of talks between the association and union.

Salaried Workers Soar 185 Pct in 25 Years

Mounting paperwork and technological competition in the steel industry over the past 25 years have brought an increase of about 185 pct in the number of salaried employees.

More than 22 pct of the steel industry's work force was salaried during 1959, as against less than 10 pct 25 years ago.

Gain in salaried staffs is an outgrowth of more complex operations and demand for more paperwork by government agencies and others, according to the American Iron and Steel Institute.

Railroad Work Rules Sent to Commission

Showdown between railroads and operating unions has been postponed again. This time for a year or more.

The work rules dispute is being handed to a tripartite Presidential Commission. The commission has been given a year to mediate a settlement or produce non-binding recommendations for settlement on or before Dec. 1, 1961.

The 15-member group, to be made up of 5 representatives each from industry and labor, and 5 appointed by President Eisenhower, is scheduled to start work between Jan. 1 and 15.

Key carriers' proposal to be solved is the one demanding elimination of firemen on diesel engines in freight or yard service. Stumbling block built by labor is the proposal for some form of severance compensation for employees affected by mergers, consolidations, abandonments, technological changes in operations, or working conditions.

Pay Pegged to Steel

Scrap yard workers in Ohio are working on a labor contract which would give them more money when steel business is good.

In a new formula being developed, the workers would be able to reopen wage negotiations whenever the steel operating rate stayed at 85 pct of capacity or higher for six consecutive months.

Current wages are being extended for a year.

IUE: Comes to Terms

Westinghouse Electric Corp. put pressure on the International Union of Electrical Workers to settle the shaky strike at General Electric Co.

Within two days the strike against GE collapsed. The Saturday settlement was virtually the same as the company's original offer. (For significance of GE's bargaining tactics, see p. 58.)

Differences between Westinghouse and GE pacts are slight. Costs are estimated to be about the same as for the original offers made by the companies.

The Westinghouse contract calls for a wage increase of 4¢ to 10¢ per hour, retroactive to Oct. 17. A similar increase will go into effect Apr. 16, 1962.

The company's original offer called for wage hikes of 4¢ to 11¢ now, 5¢ to 14¢ in 18 months. The wage-cost difference has been applied to improve fringe benefits.

Cost-of-living escalator provision, contained in the old contract, has been dropped. However, a new lay-off income and benefits plan has been instituted. It provides that laid-off workers with at least three years of service will receive one week's pay for each year of service.

In addition, the company agreed to give four-week vacations to employees with 20 years or more service. Previously, the longest vacation was three weeks for 15-year workers.

Paid holidays have been increased to eight from seven. Monthly pension payments will be boosted twice during the contract period. Hospitalization, sickness and accident benefits have been improved. And Westinghouse agreed to check-off union dues weekly.

GE's contract gives an immediate 3 pct pay hike. The c-o-l clause is eliminated. And the union has 30 days to select one of three wage and benefit options.

First provides another 3 pct wage increase in April, 1962, an eighth paid holiday, and 4 weeks' vacation after 25 years.

Second option would give a 4 pct wage increase at that time without the other benefits.

Third option offers a wage reopener clause.

CIMTROL

CINCINNATI MILLING ANNOUNCES CIMTROL DIVISION

Mr. E. J. Rivoira, manager of the new CIMTROL *Division*

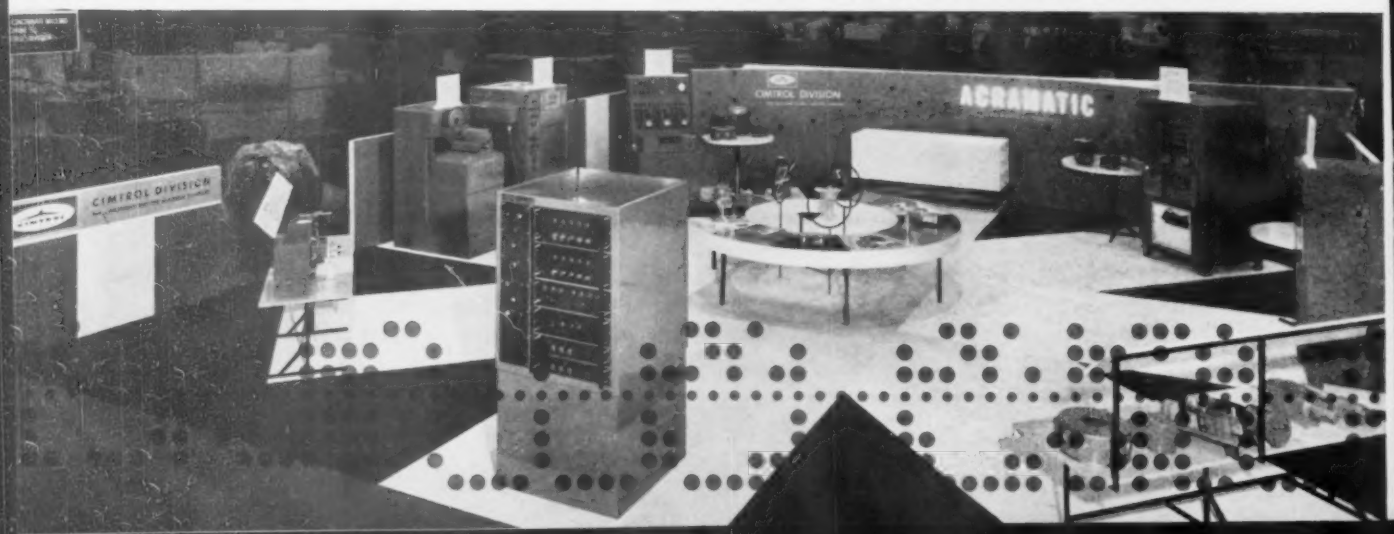
More than 30 years ago The Cincinnati Milling Machine Co. pioneered in the use of hydraulics for milling machine control. This basic method of control led to the development of many unique types of hydraulic, electronic and electro-hydraulic controls and systems—for milling, grinding, die sinking, broaching and special machines built by Cincinnati.

So important is this technology today that Cincinnati has established the CIMTROL Division (compounded from the words "Cincinnati Milling" and "control"). The only full line manufacturer of machine control systems, this new Division is responsible for engineering, manufacturing, marketing and servicing of controls for applications in products of original equipment builders.

The CIMTROL Division's exhibit at the Machine Tool Exposition presented three groups of products: ACRAMATIC Numerical Control; ACRATRACE tracing systems; ACRASIZE gaging systems. The Division also offers programming services for ACRAMATIC Numerical Control. Original equipment builders are invited to present their machine control problems to Cincinnati. CIMTROL Division engineers have the background to work out the best solution. **Cimtrol Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

CIMTROL **CINCINNATI®**

The most significant exhibit at the recent Machine Tool Exposition . . . CIMTROL *Division's display of controls for original equipment builders*



★ Curbs on Ore Imports?

The fate of imported iron ore is now being decided in Washington. The decision to be made is whether or not tariffs or quotas should be imposed on iron ore now shipped into the U. S. duty-free.

The decision will have a far-reaching impact on the entire steel industry.

The U. S. Tariff Commission is moving into the final phase of its investigation of the effect of iron ore imports on the domestic industry. Its final report will be made before Jan. 1. If any changes in the duty-free status of the ore are recommended by the commission, President Eisenhower must make the final decision.

From the first, the problem has shaped up as a battle between the major steel companies and the iron mining areas of Wisconsin and Minnesota. The United Steelworkers of America is backing the companies.

The battle reached its highest pitch at Tariff Commission hearings in Washington last week.

At the hearings, spokesmen for the mining areas contended the domestic industry cannot survive the increasing imports and the flow of American money to establish foreign mines and plants. The communities seek tariffs and quotas on imported ore.

Officials of the steel companies and the union said such tariffs and quotas have no legal basis. They added that any local relief which tariffs might provide would be offset by harm to the steel industry.

A Minnesota attorney, Robert S. Nickoloff, recommended a carefully devised quota on foreign iron ore imports, coupled with a fast Federal tax write-off for domestic taconite plant construction.

■ What Caused New Housing Lag?

The 17 pct drop in housing activity reported for last month (See p. 7) has become a political football.

Housing Administrator Norman P. Mason said the dip was caused by Democratic "pie in the sky promises." He said promises of direct government loans and subsidized interest rates was making people delay house buying.

Senate Democratic Leader Mike Mansfield, countercharged that Mason, himself, had caused the drop by blocking Democratic housing legislation in the past Congress.

Independent housing experts in Washington say both men have gone off the deep end. The experts feel the 17 pct figure may be a statistical freak. The answer will come when this month's figures are compiled.

■ Unified Service Foes Marshal Forces

U. S. military leaders are trying to stop another push for a unified Armed Forces before it gets started. Pentagon brass say they have assurances from Presidential candidates that a single-uniform military will not be a White House desire.

The reason for the military's early anti-merger action:

Those who wanted to unify the services completely when the Defense Dept. was reorganized in 1958 were talked into giving the '58 revamp a chance to prove itself before any other broad schemes were broached. The pro-merger forces are beginning to feel the time is up. And they still are not satisfied.

■ Next Step On Steel-from-Slag

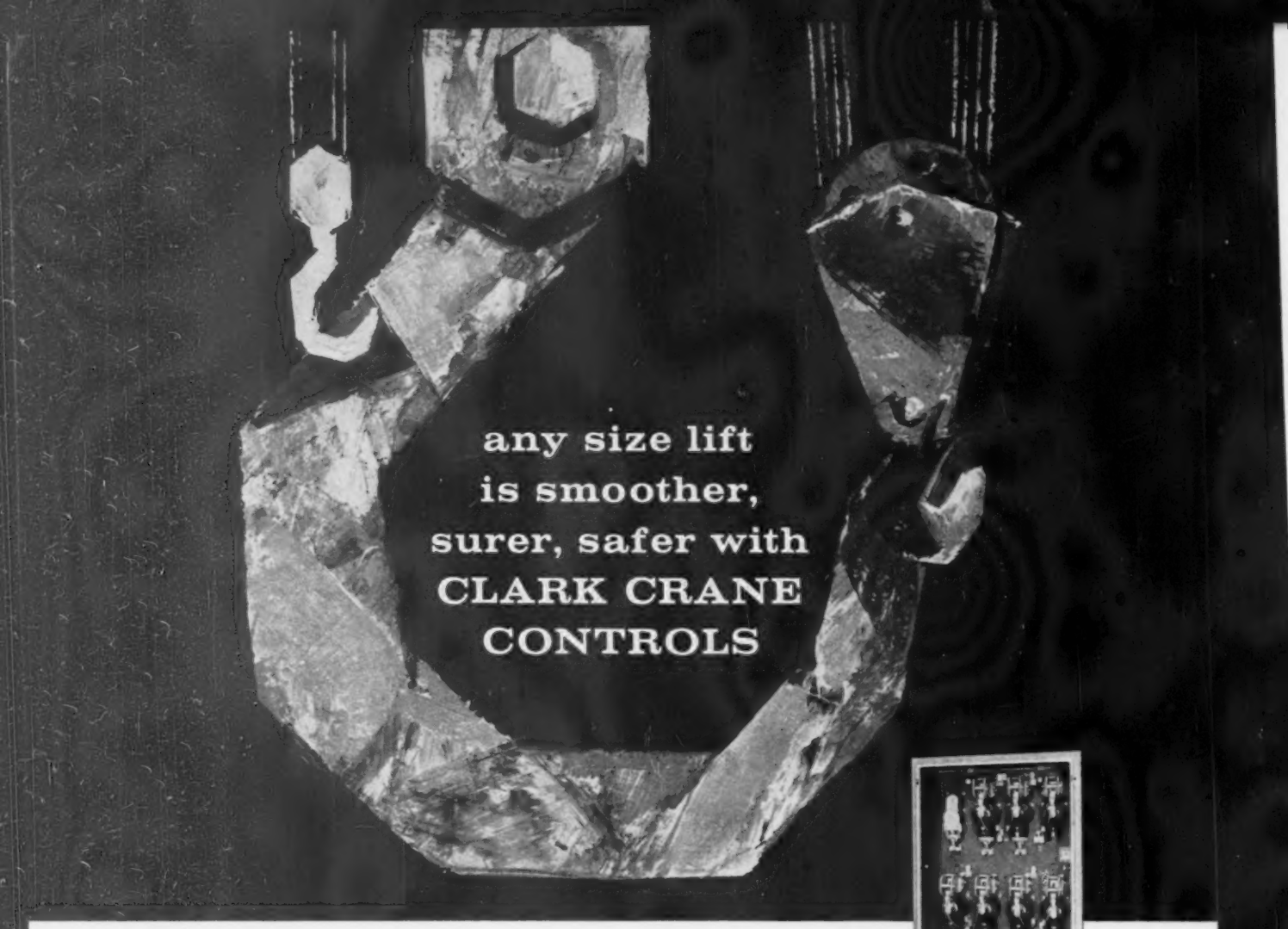
A 20-year contract for electric power to supply a new type steel mill has been signed by The Bonneville Power Administration and Webb & Knapp, Inc.

The contract calls for the power supply to the mill planned by Webb & Knapp at Anaconda, Mont. (The IRON AGE, Oct. 1, 1959, p. 46). A total of 120,000 kw of power will be delivered. Half the supply will be delivered starting July 1, 1963; the remainder by Nov. 1, 1963. About 45,000 kw are firm and 75,000 kw are secondary industrial type.

SIGNING: 20 Years Power.*

Webb & Knapp will build a steel mill with 350,000 tons annual capacity. The mill will cost nearly $40 million. It will use the new Strategic-Udy process to make steel from iron left in discarded copper slag at the Anaconda Co.'s smelter.

*Signing the contract are: Dr. William A. Pearl, administrator of Bonneville Power Administration; and William Zeckendorf, president of Webb & Knapp. Witnessing the signing are from left to right: Robert O. Denman, vice president of Strategic Materials Corp.; Fred C. Foy, president of Koppers Co.; and Sen. Mike Mansfield (D., Mont.)



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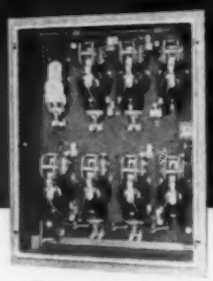


Travel control panel for light industrial crane.

Whether you want a utility crane for light industrial lifting or a "big boy" for handling steel mill ladles, you'll get the best in controls by specifying Clark. All crane manufacturers are able to supply Clark Controls on any size or model crane in their line.

Complete electrical panels built by Clark have these maintenance-saving components and features:

Cushion mounting of individual components provides utmost protection of apparatus against mechanical shock and vibration.

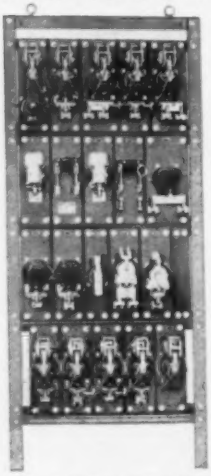
Exclusive Clark "Vari-Time" acceleration provides "guaranteed-for-life", adjustable, definite time control—combines simplicity and reliability with minimum maintenance.

Simple, two-coil Plugging Relay provides accurate reversals of crane motors, maintaining safe armature current and torque limits for maximum motor protection.

Rugged Overload Relays designed specially for heavy-duty industrial service are positive acting and easy to adjust and maintain.

Also available is a full line of crane control accessory devices including brakes, master switches, resistors and protective panels.

Your next crane can be factory-equipped throughout with reliable Clark Controls for safety and ease of maintenance. Contact your Clark sales office for a copy of the 20-page Bulletin 9100 describing "Clark D-C Crane Control". Or write to: 60C1



Hoist control panel for heavy industrial crane.

The
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Company

Main Plant: *Cleveland 10* • **Western Plant:** *Los Angeles 58*
In Canada: *Canadian Controllers, Limited, Toronto*

Japan Builds Industry To Serve China, Africa

While most American eyes are turned toward the industrial growth of Western Europe, Russia and Great Britain, Japan keeps pushing ahead with long-range plans that may someday catch the unwary by surprise.

Most of Japan's planning is centered around steelmaking and the necessary tools for it: Iron ore, scrap and manganese and other additives.

It's no secret that for the last few years Japanese industrialists have been scouring the world for good ore sources. Plans and deals are being made or prepared every day. Some of these involve dealings in South America.

But the main point is that Japan's industries are rapidly preparing to step into a stellar role of economic prominence for the industrialization of China and Africa.

A good example of Japan's constantly growing importance as a key steel producer is the fact that last year it replaced France as the fifth largest steel producer. And this year production is again climbing. The Japanese Ministry of International Trade and Industry estimates that new steel production records will be set in 1960.

Estimated output for the year, in million metric tons: Crude steel, 19.7; blast furnace pig iron, 11.1; and ordinary rolled steel products, 14.

British Auto Output Falls Rapidly

Following in the footsteps of France, the British auto industry is suffering through hard times.

Orders for passenger cars have fallen off drastically and layoffs are general. Vauxhaul (General Motors) has laid off 1000 men. The British Motor Corp., makers of Austin and Morris cars, have put 23,500 of their 51,500 workers on short time. The Rover Co. is on a four-day week, Ford has eliminated all overtime, and Standard Triumph has laid off some workers and put others on short time.

As in France, where Renault laid off 3000 workers in August, the blame lies principally in the fact that exports to the U. S. are dwindling. To boost home sales, British automakers have asked for a cut in the purchase tax. To sell more cars outside the country the companies are likely to start a cooperative sales drive.

AUSTIN: U. S. sales drop.

Truck sales in Britain, however, are reported steady for the present.

Imports May Climb On Farm Equipment

Importers of foreign-made farm equipment are now enjoying a healthy U. S. market and most likely will continue to do so over the next few years.

Tractor imports are now running at 7 pct of total U. S. sales. It's expected that they will stay at this level or possibly even rise in the next few years. No one in the industry predicts a reversal of this trend in the near future.

Export Expansion Plan Moves Ahead

Despite a budget half the size it asked for, the U.S. Dept. of Commerce is moving ahead with its export expansion program.

New programs to increase U. S. business abroad include an invitation to American businessmen to bid for foreign trade and an intensive worker training program.

The purpose of the business proposal program is to turn over to the government's trade missions proposals from American companies to enter into business arrangements in foreign countries. The trade mission will take the proposition abroad to see if a deal can be closed.

Commerce is putting all its foreign service personnel through a four-week training course as part of the drive to hike exports. About 40 pct of the time will be spent on projects involving foreign marketing problems and actual research dealing with specific commodities.

Allegheny Ludlum Plans New Belgian Mill

Plans for the formation of a major new stainless and special steel company in Western Europe were announced this week by Allegheny Ludlum Steel Corp., Pittsburgh, and the Belgian companies, Evence Coppee and Cie, Brussels, and Societe Anonyme Metallurgique D' Esperance—Longdoz, Liege.

This follows the Crucible Steel Co. of America move of a month ago (IRON AGE, Sept. 29) when the U. S. company bought 75 pct of an Italian specialty steel company.

The company plans to build a steel plant in Belgium involving a capital investment of $10 million. The plant is expected to be producing flat-rolled stainless and special steel products by 1962.

TIME AFTER TIME AFTER TIME, THE SAME HIGH MACHINING SPEEDS AND FEEDS THAT STEP UP PRODUCTION—REDUCE COST . . . TIME AFTER TIME, THE SAME CLOSE TOLERANCE CONTROL, FINE FINISH, LONG TOOL LIFE . . . THE CONSISTENT AND DEPENDABLE QUALITY AND UNIFORMITY YOU NEED . . . YOU GET . . . WITH INLAND LEDLOY® LEADED STEELS. AND NO WONDER, FOR INLAND PIONEERED IN THE DEVELOPMENT OF LEADED STEELS . . . HAS LONGER, MORE CONTINUOUS EXPERIENCE THAN ANY OTHER PRODUCER IN THE WORLD . . . ASK YOUR STEEL SUPPLIER ABOUT INLAND LEDLOY® the world's most machinable steels!

Inland Steel Company INLAND 30 West Monroe Street, Chicago 3, Illinois

New products and technical gains are twin springboards to higher profits. Nowhere was this more evident than at the ASM's Metal Congress & Exposition last week. Below are some of the top ideas and new products reported. For how some companies are capitalizing on R & D programs turn to p. 60.

Decarb: No Longer Taboo

Decarburization can be helpful—rather than harmful. So reported naval scientists and rocket engineers at the technical sessions. One rocket maker deliberately subjects steel pressure vessels to a partial decarburization treatment. The resulting "skin" is less notch sensitive, has greatly improved fracture toughness.

Controls Flame Geometry

By monitoring all factors that affect the flame, a combustion indicator takes a new approach to heat-processing control. This instrument gives advance warning of any corrections needed to prevent changes in flame geometry. It can also be used to fix desired Btu values of an air-gas mixture when the fuel gas changes due to enrichment or peak shaving with other standby gases.

Faster Materials Testing

A semi-automatic testing machine simplifies high-temperature testing. This unit simulates service conditions—with load and strain rates controllable over a wide range. Test samples can be heated slowly or in a few seconds. Complete stress-strain curves can also be plotted. Automatic programming of load or strain and temperature speeds test results.

Use of Radiography Grows

Several developments in radioisotope equipment indicate growing interest in this method of non-destructive testing. One is a mechanized drive for positioning the gamma-ray head. Another is a much higher energy source with automatic controls. The latter provides complete operator safety, reduces exposure time and extends the size and thickness of castings that can be checked.

Furnace-Gas Analyzer

Sample gases from a furnace or generator are rapidly checked by a gas-chromatography instrument. This furnace-atmosphere analyzer checks out four gases within five minutes or it can analyze nine gases every ten minutes.

Produce Pure Hydrogen

Palladium-alloy hydrogen-diffusion cells offer an economical, practical solution to the problem of hydrogen separation and purification. They yield pure hydrogen with less than one impure part per billion. These diffusion cells serve for laboratory use, pilot plants or for full-sized commercial installations.

Recover Solvents

Vapor-recovery systems reduce solvent costs while improving working conditions and protecting other equipment. They increase ventilation by preventing solvent evaporation. Reclaimed vapors return to storage drums as usable solvents. Users report solvent costs are down 50 pct.

Ceramic-to-Metal Seals

An iron-nickel-cobalt alloy helps to braze ceramics to metals. In a strain-free condition, the new alloy reduces intergranular penetration. The newcomer's low thermal conductivity approximates that of ceramics. This minimizes thermal stresses during rapid heating and cooling cycles.

Advances in Metallurgy

Haynes Stellite Co. has taken the wraps off two developments. A new diffusion-coating process imparts a surface layer with exceptional oxidation resistance. Coated samples in nickel-, cobalt- and iron-base parts withstand 2000°F for 500 hours—with no weight loss. The company also offers hot-pressed pure tungsten, for high-temperature use, on a production basis.

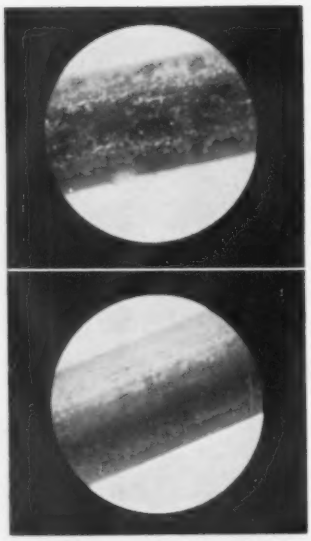
Improved Copper Coating for Wire Increases Coating Adherence, Color Uniformity

AMCHEM CUPRODINE* NO. 5 IS A LOW COST, NON-ELECTROLYTIC COATING FOR LUBRICATING CARBON AND STAINLESS STEEL WIRE, TIRE BEAD WIRE, COLOR CODING AND DECORATING PARTS

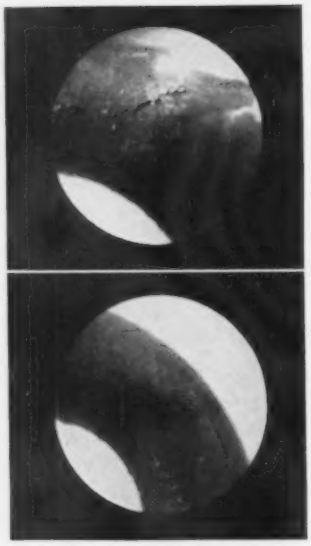
The latest Cuprodine from Amchem provides carbon and stainless steel wire and stampings with a particularly effective and adherent copper coating which appreciably reduces scratching of the wire and pickup and wear on dies during forming.

In treating tire bead wire, the uniformity of Cuprodine No. 5 coatings retained during drawing provide an excellent bonding surface for the rubber. Industry has found wide usage for Cuprodines in color coding parts while the durable and attractive copper coating provides an excellent decorative and protective finish on end products.

Investigate Cuprodine No. 5 for your own particular requirement—it's fast, economical, efficient—requires only simple immersion compared to costly racking and auxiliary equipment needed in electroplating processes.



At top, photomicrograph (50x mag.) of copper sulfated wire after removal of the coating in ammonium persulfate solution. Note heavy corrosive attack and pitting on copper sulfate-treated wire. At bottom, Cuprodine-treated wire subjected to same test.



At top, photomicrograph (50x mag.) shows copper sulfated wire after simple manual bend test. At bottom, photomicrograph shows bend tested Cuprodine-treated wire exhibiting only a slight attack to coating while copper sulfate-treated wire shows heavy flaking of coating.

Another development from Amchem's Metal Protection Laboratories, the pioneer in specialized coatings for 46 years—from the first copper coating without the use of electroplating current, to today's standard in copper coating processes—Cuprodine No. 5.

AMCHEM CUPRODINE

Cuprodine is a registered trademark of **AMCHEM PRODUCTS, INC.** (Formerly American Chemical Paint Co.), **AMBLER, PA.** • Detroit, Mich. St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.

*Amchem's registered trademark for its copper coating chemical.

LETTERS FROM READERS

True Capacity?

Sir—With all of the talk we have had about steel producing only 50 or 60 pct of available producing capacity, I have wondered how this rates in total tonnage with past years. It seems to me that we continually expand production rates and obviously older operations are becoming obsolescent and will have to be shut down. We cannot hope to keep obsolete farms, businesses or steel mills all going full blast. Can your research department send me any information regarding average monthly or weekly productivity over the past several years?—A. L. DeWindt, J. E. Rhoads & Sons, Wilmington, Del.

▪ It is interesting to note that we are currently operating at about 93-94 pct of the 1947-49 capacity. The "percent of capacity" figures for 1947-49 were 93.0 pct, 94.1 pct and 81.1 pct respectively. So actually, as you have noted, we are not doing badly and the current "percent of capacity" figures are misleading.—Ed.

On Housing

Sir—Mr. B. F. Surer's article, "Builders Get Set for Big Decade," which appeared in the Sept. 29 issue of The IRON AGE, omits direct mention of taxes as a deterrent to housing growth. Excessive taxes on material and labor have helped to price both commodities out of the middle income residential housing market. And, when you add to that almost confiscatory local property taxes necessitated by Federal and State governments' pre-empting of other tax sources, it is really surprising that housing is doing as well as it is.—Morton C. Hull, Ontario, Calif.

Contact

Sir—We have read with interest an item entitled "Sintered Nylon Self-lubes," which appeared in a recent Newsfront portion of your magazine. We would appreciate it if you could advise us as to whom to contact for further information about this process.—John N. Lynn, Papermate Mfg. Co., Santa Monica, Calif.

▪ For further information, contact Mr. Conrad H. Busch, Relations Director, The Polymer Corp., 2120 Fairmont Ave., Reading, Pa.—Ed.

Fine Work

Sir—Your one-page summary on Development Management in the Oct. 6 issue of The IRON AGE is, in my view, a very fine piece of work. The thesis of Development Management is one that some people find very difficult to grasp. But you, in your relatively brief article, have made it very simple and easy to understand.—Joseph R. Goeke, Opinion Research Corp., Princeton, N. J.

Ooops!

Sir—On p. 142 of your Oct. 6 issue you state, "As chairman, Oregon's Sen. Henry M. Jackson. . . ." Please know that this gentleman is the junior senator from the state of Washington. He is a native of Everett, Wash., and a graduate of this university. Please correct this tremendous blunder. I could comment much more pointedly, but shall refrain.—Prof. Gilbert S. Schaller, University of Washington.

▪ To Sen. Jackson, Prof. Schaller and others whose state pride has been justifiably ruffled, our apologies.—Ed.

Vote of Thanks

Sir—After reading your editorial in the Sept. 29 issue of The IRON AGE, I personally feel that you are due a vote of thanks from every reader. Your fine editorials indicate deep understanding of our nation's problems and a sincere desire to awaken the thinking of those who take our free enterprise system for granted.—L. F. Trew, United Aircraft Products, Inc., Forest, O.

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ON SOUTHERN
FASTENERS

If you're making sales plans for a new model or new product soon to be launched into orbit, Southern fasteners will help assure its success.

Southern specializes in the manufacture of standard fasteners. Top quality materials and workmanship are combined to produce the most dependable production fastener your money can buy. Burr-free heads and durable threads help step up driving speed in assembly, and thus costly down-time, rejects and injured materials are reduced.

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BASIC

YOUNGSTOWN STEEL research is creative digging. It starts with what is known, then strikes out toward tomorrow. In Youngstown's growing research center, well-staffed departments work with slide rules and hot metals. They work with abstract concepts and solid facts. With shapes. With welds and pressures and torsions and tensions. With corrosive conditions and with uncommon coatings. Avenues to better, more useable, more useful steel are opening fast at Youngstown, a growing force in steel.

NEW

YOUNGSTOWN STEEL research is available to you. There is application research to help you use steel more profitably. Metallurgical research to make new steels in answer to new problems. Product research to help you capture a market. All in addition to continuing basic raw material and process research to give you better steel to work with. From tiny test induction furnace heats to miniaturized rolling mills to technical field work, research works for you at modern Youngstown, a growing force in steel.

Youngstown –

THE YOUNGSTOWN SHEET AND TUBE COMPANY, YOUNGSTOWN, OHIO.

ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND COLUMBUS DALLAS DENVER DES MOINES DETROIT

STEEL R&D

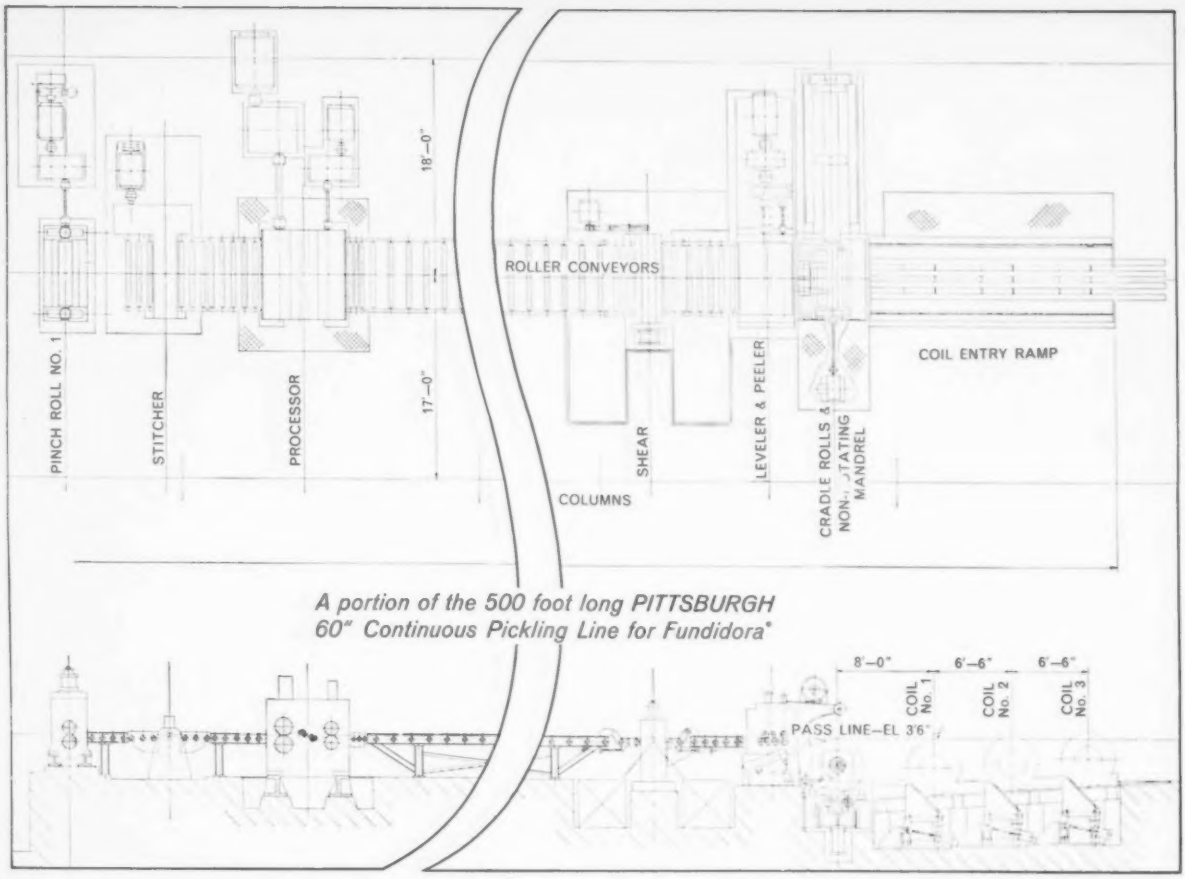
YOUNGSTOWN STEEL research touches atoms and reaches into space. It is a photomicrograph of blue-hued grain. A rending, screeching tensile test. It is a piece of paper covered with a scientist's precise symbology. It is an idea that will improve the already high quality carbon, alloy and Yoloy steels you can buy from Youngstown. Add it up: fine steel sheet, pipe, bar, tin plate, rod and wire products. Reliable service. Plus creative research to back it up. All from Youngstown, a growing force in steel.

YOUNGSTOWN STEEL research is making the stronger, more workable steels of tomorrow. Economical steel, that today does more things better than any other metal, has vast new fields to conquer. From deeper-probing Orange Band drill-pipe to thinner gauge tin plate, to new basic steels, to bold new concepts of tubular construction, steel is destined to play a greater role in your everyday life. Depend on it, just as you can depend on the quality products of Youngstown, a growing force in steel.

growing force in steel

Steel

GRAND RAPIDS HOUSTON INDIANAPOLIS KANSAS CITY LOS ANGELES MILWAUKEE MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS SAN FRANCISCO SEATTLE TULSA WASHINGTON



*A portion of the 500 foot long PITTSBURGH 60" Continuous Pickling Line for Fundidora**

Fundidora* Chooses a PITTSBURGH Continuous Pickling Line in its Plant Expansion Program

Electric and open hearth steel castings from 1 lb. to 100 tons

A PITTSBURGH 60" Continuous Pickling Line has been specified for expanded plant facilities at Cia Fundidora De Fierro y Acero De Monterrey, S. A.* as part of the company's multi-million dollar expansion program to meet the growing demand for steel in Mexico. This installation is typical of the primary and auxiliary rolling mill equipment PITTSBURGH designs and manufactures for the steel industry to exacting customer requirements. We can help you in your requirements. Your inquiries are invited.

PITTSBURGH
ENGINEERING & MACHINE DIVISION
Pittsburgh Steel Foundry Co., Textron Inc.

564 FORBES AVE., PITTSBURGH 19, PA. • PLANTS AT GLASSPORT AND McKEESPORT, PA.

Our National Issues

A record number of Americans will vote for the presidential candidate of their choice "on the Tuesday next after the first Monday in November."

And as Tom Campbell, IRON AGE editor-in-chief wrote last July, "For the first time in many years—if not in history—a fair-sized number of citizens will think hard before they vote."

Deep Thinking—Few will have done as much hard and deep thinking by election day than Tom Campbell himself. For the past seven weeks, in his editorials, he has come to grips with the basic issues facing all Americans, not only in this election year, but in the years to come.

He has taken our national issues apart and analyzed them for what they really are, not what politicians of different persuasions say they are.

In his editorials on national issues, he has cut through the slogans, verbosity, and fuzzy thinking which obscure the real problems involved with our rate of growth, difficulties in fighting Communism, and our image as a nation before the rest of the world.

Our Heritage — Tom's main concerns are people and matters of spirit, not things and matters of the moment. But it is people who make things and their national spirit which moves events.

Nowhere is Tom's own spirit more evident than this week in the final part of the Editorial Series, Our National Issue. He says, "We have the leaders, the heritage and the challenge. With this combination we should be indestructible."

Water From the Sea

An old (and slightly shopworn) saying goes, "There's nothing new under the sun."

Proof that the adage still has bounce came to light while one of our editors was doing research for this week's special report on industrial water, (see p. 55).

One aspect of the water problem getting the most study today is conversion of sea water into fresh. It's looked on as an important step in meeting tomorrow's water needs.

As Old As Time—Yet in his search for good water, man has been thinking about sea water conversion for a long time. Aristotle wrote about it during his time. Caesar found a way to do it at Alexandria. Francis Bacon discussed the problem in the 1560's.

Secret Ingredient—One of the most interesting stories, however, concerns Thomas Jefferson. While he was secretary of state, Mr. Jefferson looked into the "secret" distillation process of one Jacob Isaacks for making salt water into fresh.

Mr. Isaacks did make 22 pints of fresh water from 24 pints of salt water, and later 31 pints of fresh water from 32 pints of sea water.

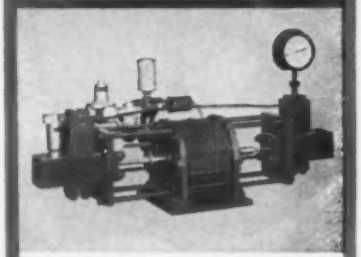
Jefferson was impressed, but wanted to try the experiment without the secret ingredient. Starting again with 32 pints of water (and no formula x), the same amount of fresh water, 31 pints was obtained, but with 10 pounds less wood used in the furnace.

Buttonholing

Both Vice President Nixon and Senator Kennedy are doing their bit to help sagging steel output.

Although their efforts are not going to bring a boom to the industry, at this point every bit counts. How are they doing it? Campaign buttons. One button itself uses a very insignificant amount of steel. But when 40 million are produced for a candidate, this mounts up to a considerable sum. The slogans and portraits are lithographed on sheets of tin plate. Then the buttons are stamped out and formed.

ALDRICH
AIR-DRIVEN HYDRAULIC PUMPS



For production service: Heavy duty 6-inch stroke pump, single or double acting.

For production or laboratory . . . handling small volumes of fluid at pressures up to 50,000 psi.

For hydrostatic testing . . . tubing, valves and pressure vessels.

For operating hydraulic presses, cylinders and valve positioners.

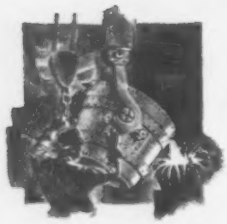
Immediate shipment from factory stock.

For intermittent service: 3-inch stroke pump has low first cost, high reliability.

Aldrich air-driven hydraulic pumps operate on normal plant air. They are compact, simple to install, economical to operate. Write today for Data Sheet 36 (6-inch stroke) or Data Sheet 36A (3-inch stroke).

ALDRICH

ALDRICH PUMP COMPANY
8 PINE STREET, ALLENTOWN, PA.



AMERICAN ORIGINALS IN IRON AND STEEL

Samuel Higley—America's First Steel Maker

The credit for producing the first steel in America goes to Samuel Higley of Simsburg, Connecticut. In the Connecticut State Library there is a certificate signed by two blacksmiths . . . Phelps and Drake, stating that Higley took specially shaped wrought iron from them and later returned with the iron refined into steel.

This certificate is dated May 7, 1728, but it has been established that Higley's first experiments bore fruit in or around 1725. Based on the testimony on this certificate Higley and his associate Dewey were awarded patent rights to run for ten years.

It is believed Higley made his steel by the cementation process. In this process, charcoal was packed around wrought iron bars and the whole mass was heated in a closed furnace for a week or more. The longer the iron was heated, the more carbon it absorbed from the charcoal. This "blister-steel," or rather, an iron core with a steel surface, was poor in quality by modern standards, but it was the beginning of one of America's greatest industries.

Years ago, as a result of continuous experimentation, The J. E. Baker Company developed Baker's Magdolite, the original dead-burned dolomite. Today, Baker's Magdolite delivers more uniform ingots with less defective production material. It is always 5 ways better, in composition, preparation, strength, economy and quality.

ANOTHER AMERICAN ORIGINAL

JEBCO
PRODUCTS
SINCE 1889

BAKER'S MAGDOLITE
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

COMING EXHIBITS

MHI Central States Show—Nov. 1-3, Kentucky Fair and Exposition Center, Louisville, Ky. (The Material Handling Institute, One Gateway Center, Pittsburgh.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Armory, Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

Western Tool Show—Nov. 14-18, Memorial Sports Arena, Los Angeles. (American Society of Tool and Manufacturing Engineers, 10700 Puritan Ave., Detroit 38.)

Power and Mechanical Engineering Show—Nov. 28-Dec. 2, Coliseum, New York. (American Society of Mechanical Egineers, 29 W. 39th St., New York 17.)

MEETINGS

OCTOBER

National Fluid Power Assn.—Fall meeting, Oct. 30-Nov. 2. The Edgewater Beach Hotel, Chicago, Association headquarters, 5595 N. Hollywood Ave., Milwaukee.

American Institute of Steel Construction, Inc.—Annual convention, Oct. 30-Nov. 3, Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 101 Park Ave., New York, N. Y.

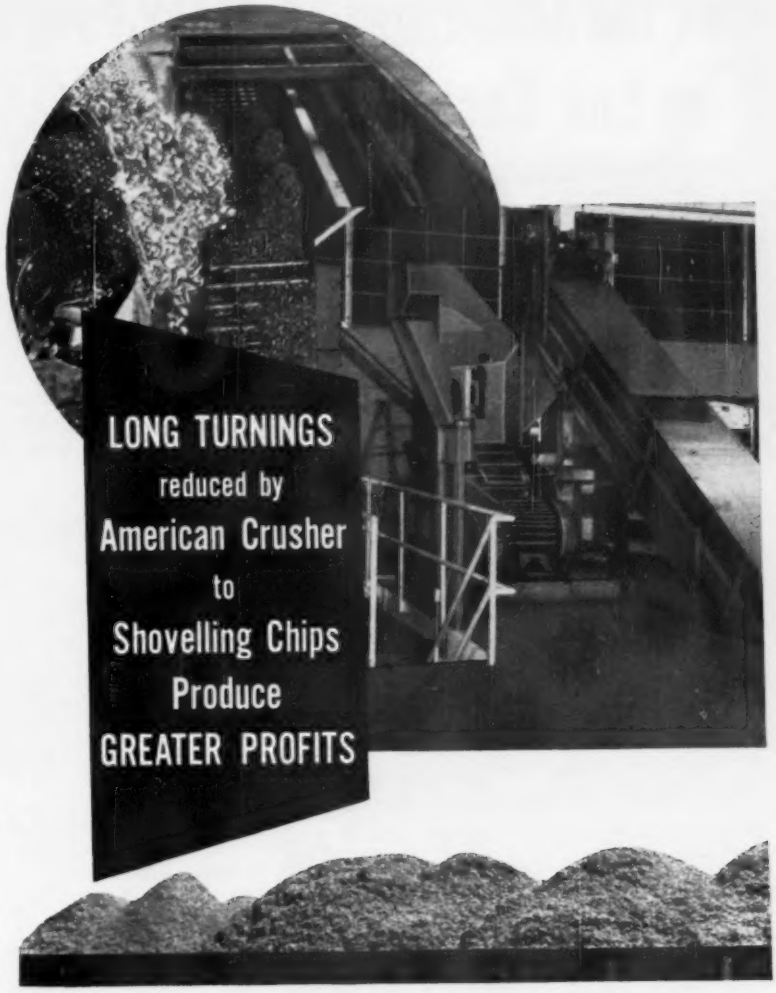
NOVEMBER

Porcelain Enamel Institute, Inc.—Shop practice forum, Nov. 2-4, University of Illinois, Urbana, Ill. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

National Machine Tool Builders Assn.—Annual meeting, Nov. 2-4, The Homestead, Hot Springs, Va. Association headquarters, 2139 Wisconsin Ave., N. W., Washington, D. C.

American Production & Inventory Control Society — Annual national conference and technical exhibit, Nov. 3-4, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 330 South Wells St., Chicago 6, Ill.

The Anti-Friction Bearing Manufacturers Assn., Inc. — Fall meeting,



American Metal Turnings Crusher

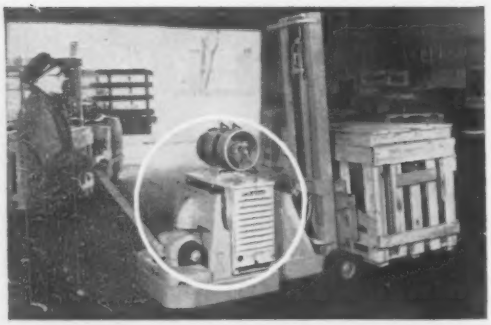
. . . increases profits . . . improves handling

An almost fully automatic chip salvage system, with an American Metal Turnings Crusher at its heart has increased profits, saved space, and improved housekeeping at a ball bearing plant, conveyors service two rows of automatic screw machines and feed a cross-over conveyor. The cross-over conveyor feeds turnings directly into an American Metal Turnings Crusher which reduces the turnings to uniform sized chips. From the crusher chips are conveyed to a hopper to be periodically discharged into a chip-wringer to reclaim cutting oil. Dry chips drop into a discharge hopper and feed into an air duct which pneumatically conveys the chips to a storage bin at the rail siding.

Literature on American Metal Turnings Crushers is yours for the asking.

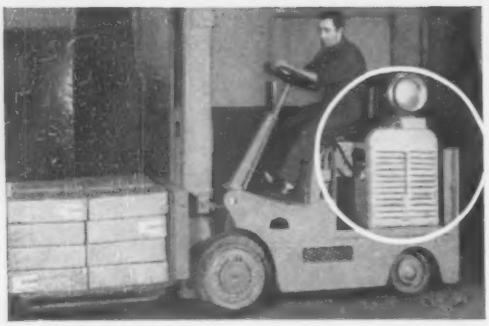
American PULVERIZER COMPANY
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
1439 MACKLIND AVE. ST. LOUIS 10, MO.

Get the Advantages of READY-POWER on Your Electric Industrial Trucks



Get Live Power for Walkie Trucks

Ready-Power's popular bantam model "W" is equipped with dependable 12-volt automotive-type starting and ignition. Variety of idling speeds and easy accessibility make it ideal for all walkie trucks as well as rider trucks up to 2,000 lbs.

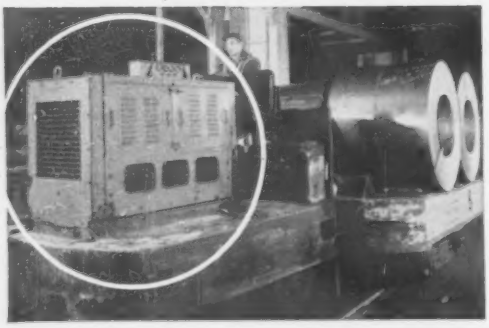


Work Your Fork, Platform, Tractor Trucks 'Round the Clock

Ready-Power gas-electric and LPG-electric units give materials handling trucks continuous, full power all the time. Slowdowns due to power fatigue are eliminated. The simple, all-electric control and live response make Ready-Power-equipped trucks rate high with truck operators.

Energize Lift Magnets on Your Electric Trucks

In the application shown at the left, the Ready-Power unit not only powers the truck, but also energizes the lift magnet for handling scrap metal. Ready-Power units are removable for shop adjustment while a spare keeps trucks working.



Get Diesel Electric for Lowest Ton-Mile Costs

Take a tip from the owners of industry's biggest trucks . . . power them with Ready-Power diesel-electric for maximum stamina, dependability, and lowest operating costs. Ready-Power offers power for every size and make of electric truck.

Your Truck is No Better than its Power . . . Write for Information on Ready-Power gas-electric, LPG-electric, and Diesel-electric Units

READY-POWER

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

MEETINGS

Nov. 3-5, Hollywood Beach Hotel, Hollywood Beach, Fla. Association headquarters, 60 E. 42nd St., New York.

Society of Plastic Engineers, Inc.—Regional technical conference on automation in injection and compression molding, Nov. 7, King Edward Sheraton Hotel, Toronto, Ontario, Canada. Society headquarters, 65 Prospect St., Stamford, Conn.

National Assn. of Secondary Material Industries and the **Institute of Scrap Iron & Steel**—Joint Pacific Coast conference, Nov. 13-15, Beverly Hilton Hotel, Los Angeles. Headquarters: NASMI, 271 Madison Ave., New York 16; ISIS, 1629 H St., N. W., Washington 6, D. C.

Steel Founders' Society of America—Technical and operating conference, Nov. 14-16, Hotel Carter, Cleveland. Society headquarters, Terminal Tower, Cleveland 13.

National Electric Mfrs. Assn.—Annual convention, Nov. 14-17, Hotel Traymore, Atlantic City, N. J. Association headquarters, 155 E. 44th St., New York.

Wire Assn. — Annual convention, Nov. 14-17, La Salle Hotel, Chicago. Association headquarters, 453 Main St., Stamford, Conn.

Building Research Institute — Fall conference, Nov. 15-17, Shoreham Hotel, Washington, D. C. Society headquarters, 2101 Constitution Ave., N. W., Washington 25, D. C.

Copper & Brass Research Assn.—Fall meeting, Nov. 16-17, Castle Harbour Hotel, Bermuda. Association headquarters, 420 Lexington Ave., New York 17.

National Warm Air Heating & Air Conditioning Assn.—Annual convention, Nov. 16-17, Statler-Hilton Hotel, Cleveland. Association headquarters, 145 Public Square, Cleveland.

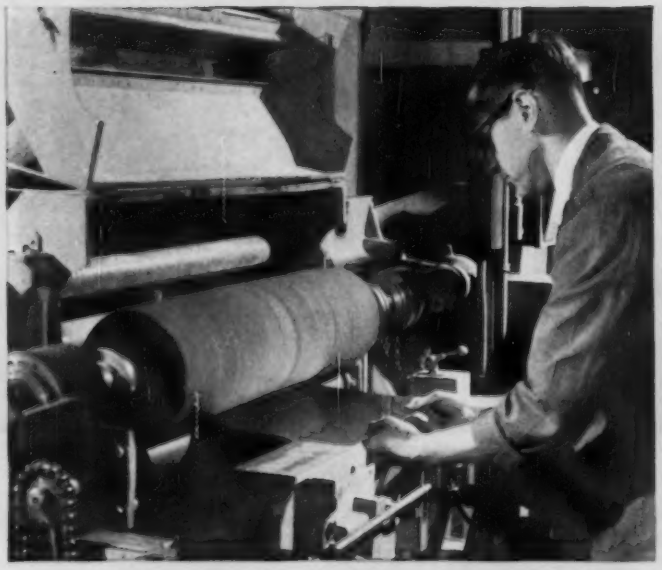
Aircraft Industries Assn. of America — Fall meeting, Members & Board of Governors—Nov. 16-18, Phoenix, Ariz. Association headquarters, 610 Shoreham Bldg., Washington, D. C.

ANOTHER NORTON PRODUCT

IT'S NEW IT DOES A JOB

And How!

The BEAR-TEX Wheel ... *Newest Aid for Metal Finishing*



Here's a BEAR-TEX Wheel, on an oscillating spindle, providing a uniform, streak-free finish on flat sheet.

What is it?

It's a completely new product . . . a wheel formed of non-woven fabric, impregnated throughout with grain and adhesive. Used dry or with lubricant, under light pressure at speeds of 2000 to 3000 sfpm.

What does it do?

With a BEAR-TEX Wheel you remove light scale or rust. You produce matte or satin finishes. For example: satin finishing bright rolled metals . . . or blending fabricated steel parts to match No. 3 or No. 4 finish . . . or applying decorative satin finishes to non-ferrous sheets. It's so new, no one yet knows how much it can do! But we do know, on the above jobs, you do them fast, beautifully, inexpensively.

How many kinds?

There's a wide assortment of BEAR-TEX Wheels available. Silicon carbide or garnet grains. Medium, fine, very fine. Soft or medium resiliency. Diameters from 3 to 16 inches. Widths from 1 through 50 inches. And a variety of center holes.

Want a try?

Good. Just write Dept. IA-10 for a demonstration. BEHR-MANNING CO., Troy, N. Y., a division of Norton Company.

BEAR BRAND *Abrasives*

This is the largest installation of soaking pits ever built at one time. It will heat an average of 750 tons of ingots per hour. At peak capacity, it will fill the ingot buggies at a rate of 1200 tons per hour.

Worldwide engineering and manufacturing facilities through associates in Australia • Belgium • France • Germany • Great Britain • Italy • Japan

■ Forty-eight soaking pits on *one order*. There's a bold act of customer confidence for you! Confidence in the future, for one thing. Confidence in the principle of the Surface one-way fired soaking pit with the jet pump recuperator system. Many other steelmakers have shown similar faith in Surface—a source of pride, matched by our determination to deserve it,

wherever heat is used in industry

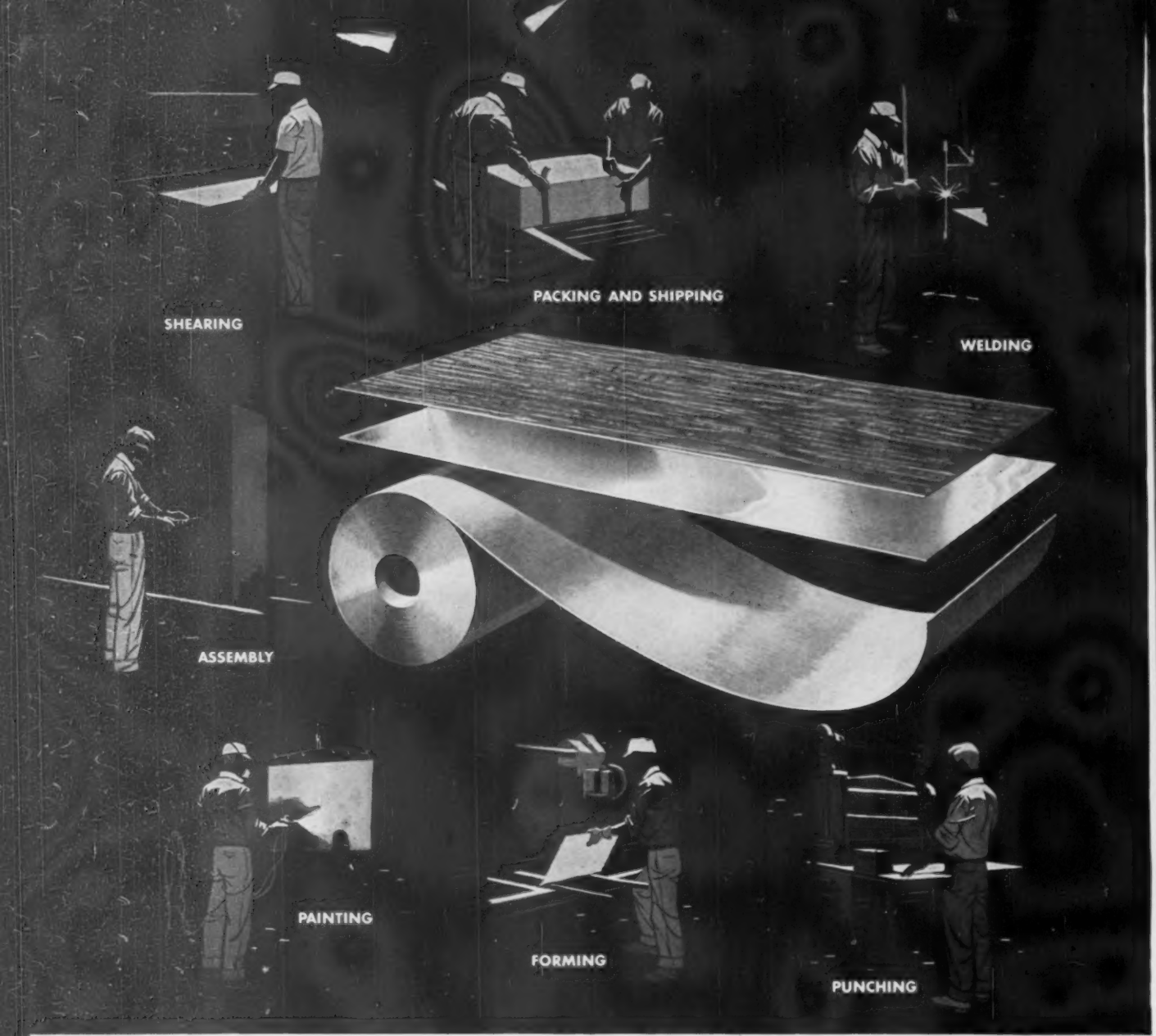
48 PITS

SURFACE COMBUSTION

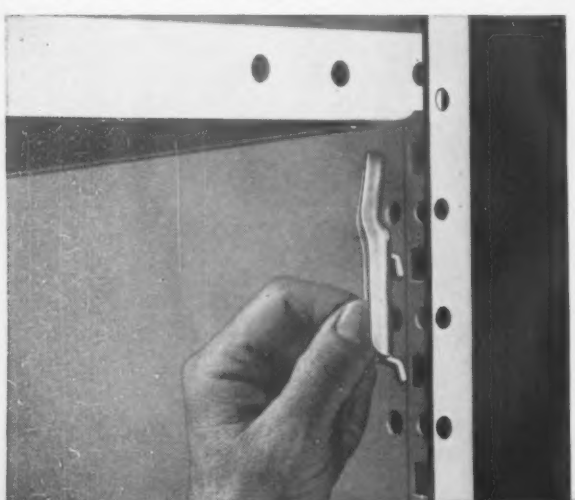
2402 Dorr Street, Toledo 1, Ohio

A Division of Midland-Ross Corporation

Surface



REPUBLIC COMPRESSION SHELF CLIP is designed to ease and speed steel shelving erection. No tools needed. Simply slip clips into uprights, snap shelf in place. Supports heavy loads safely. Republic Compression Shelf Clip is an economical method of solving shelving problems and is a profitable investment for over the years service. Write for complete specifications and data.



REPUBLIC ROLL-OVER BOXES are used in moving materials to assembly lines at Whirlpool Corporation, St. Joseph, Mich. Channel shaped legs enable narrow forks to enter the legs, lift the unit, roll it over to hopperize the load, then return the unit to a normal upright position. To learn how Republic Units save production time and costs, write today.

REPUBLIC SHEET STEEL FABRICATION "KNOW-HOW"

Solves Manufacturing, Assembly, Delivery problems

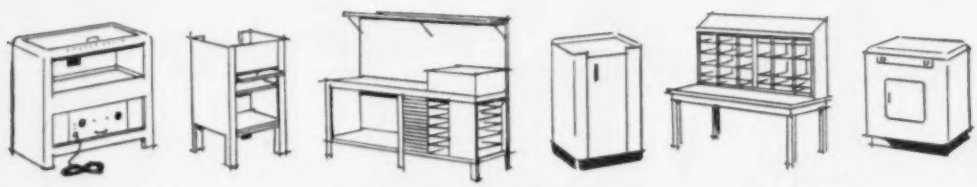
Republic's Berger Division complete sheet steel fabrication "know-how" may be the answer in giving your products a new look, new market acceptance, new sales potential.

Berger has experienced engineers and craftsmen, and the facilities and abilities to manufacture sheet steel products from galvanized steels, stainless steels, and the new vinyl coated sheet steels.

Berger offers a well rounded stock of tools and dies, modern assembly lines for shearing, punching, forming, finishing, and painting. Standard and special arc, spot, and gas welders designed for production line assembly. Tumbling barrels and plating equipment. Grinders and sanders.

Finest finishing facilities, including Bonderizing and electrostatic paint spray equipment. Finishing conveyors through spray booths, dip tanks, and baking ovens. Automatic material handling equipment. Completely mechanized crating department with conveyor line carton-packaging facilities.

Let Berger Division engineers work with you in designing and developing your product. Use Berger facilities to solve manufacturing and delivery problems. For complete details, contact Berger's Contract Manufacturing Department, today!



FABRICATING GALVANIZED STEELS... STAINLESS STEELS... VINYL COATED SHEETS

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL LOCKERS give change, wash, and dress centers a new look, protect employee valuables and tools. Available with popular locking devices. Handles attached with tamper-free Gulmite screws and lockwashers. Bonderizing protects against rust and corrosion, reduces maintenance costs. Republic will help you with your locker planning and assume full responsibility for installation. Send coupon.

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Please send more information on the following products:

☐ Republic Contract Facilities ☐ Have representative call
☐ Republic Compression Shelf Clip
☐ Republic Material Handling Service ☐ Republic Steel Lockers

Name_____ Title_____

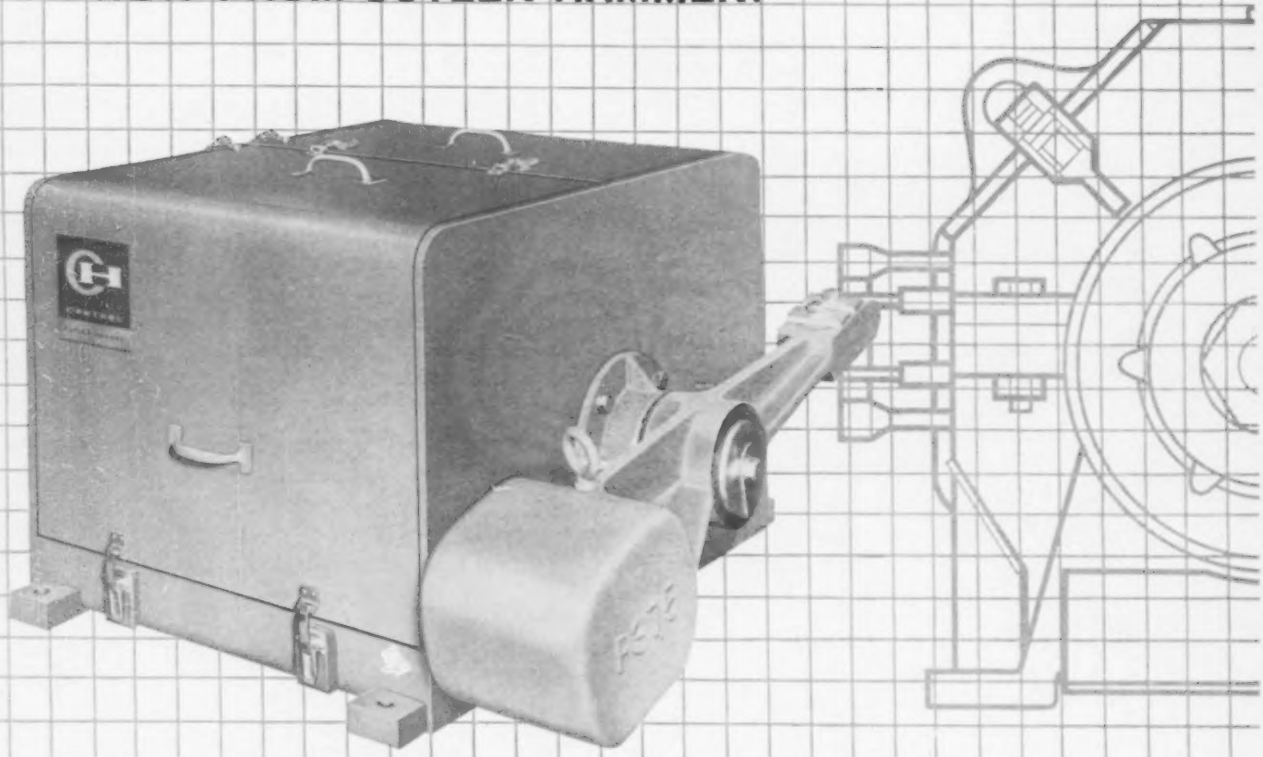
Firm_____

Address_____

City_____ Zone____ State_____

CONTROL

NEW FROM CUTLER-HAMMER!



P-375 CRANE SAFETY LIMIT STOP

EXCLUSIVE—FOR FRAME 618-622 MILL MOTORS

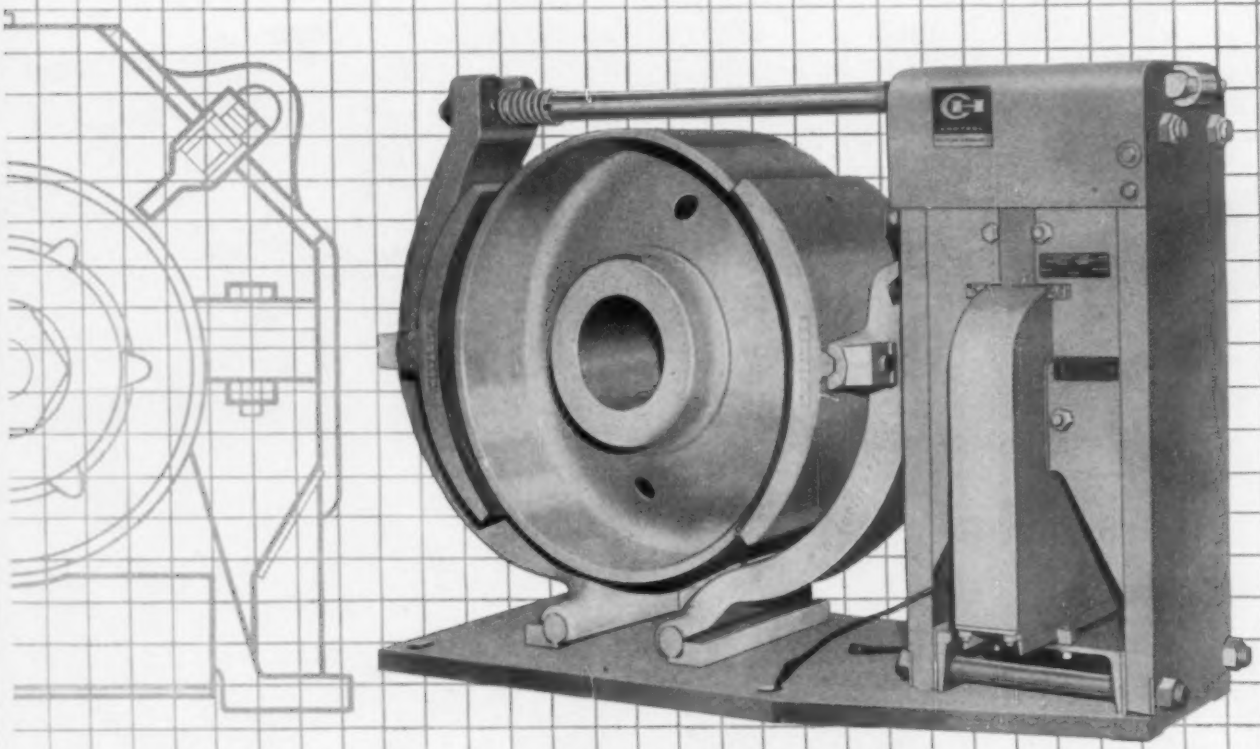
2 exclusive accessories

New Cutler-Hammer P-375 Crane Safety Limit Stop is especially designed for safe operation of large frame 618-622 mill motors. It is the *only* crane stop that eliminates the need for duplex switches for applications over 200 hp. Bearings are prelubricated and sealed. The heavy fabricated steel construction of the P-375 makes it highly resistant to the shock and stress of crane duty. Weathertight enclosure permits outside use. P-1, P-100, P-200 crane stops are also available for smaller cranes. For complete details call the nearest Cutler-Hammer sales office.

With the new 30″ 505 Mill Brake Cutler-Hammer offers the finest line of D-c mill brakes and the broadest range of sizes. You can get the 505 Mill Brake in 8″, 10″, 13″, 16″, 19″, 23″ and 30″.

Simplicity of design makes the 505 line extremely reliable. Only 10 major parts, all easily accessible. All adjustments can be easily made. Get full details by sending for Pub. U246.

The same kind of reliability that has made Cutler-Hammer mill control equipment preferred by so many mill engineers has been built into the P-375 Crane Stop and the 30″ Mill Brake.



30" 505 MILL BRAKE

EXCLUSIVE—FOR FRAME 620-622-624 MILL MOTORS

for large mill motors!

WHAT'S NEW AT CUTLER-HAMMER?
New, better products like these two are being constantly developed by Cutler-Hammer. We're ready for the great technological growth of this decade with the plant facilities, engineering talent and a desire to help you grow. Contact the nearest Cutler-Hammer sales office to see how we can help you.

WHAT'S NEW? ASK...

CUTLER-HAMMER

CONTROL

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A.• Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

X-A-R ABRASION RESISTANT STEEL

ARMS CUTTING BLADE WITH HARD, TOUGH EDGES

Steel

Look for the STEELMARK on the products you buy; place it on the products you sell.

The business end of this land-clearing blade takes a real beating from terrain and timber. It downs brush, trees of all sizes—everything in its path. Shears off stumps at ground level. Piles cut materials into windrows. Drives its stinger through sturdy large trees to split and weaken them. Cuts a wide swath below ground level to build V-type drainage ditches. Works long, hard and fast. ◆ The point of it all? Edges made from ¾" and 1" X-A-R 15 with a hardness of 360 BHN. X-A-R is the name for tougher, harder alloy steels developed by Great Lakes Steel especially to meet abrasion problems. They're made to work better and last longer wherever materials collide with equipment—as liners, teeth, bars, blades, and plates for example. *Under conditions that commonly wear out equipment in a hurry, X-A-R*

Great Lakes Steel is a division of

X-A-R STEELS ARE AVAILABLE AT THESE STEEL SERVICE CENTERS

Benedict-Miller, Inc. Lyndhurst, New Jersey	Joseph Demsey Co. Cleveland, Ohio	Ducommun Metals & Supply Co. Los Angeles, California	Interstate Steel Co. Evanston, Illinois	Lockhart Iron & Steel Co. Pittsburgh, Pennsylvania

Rome K/G Clearing Blades made of X-A-R—manufactured by Rome Plow Company, Cedartown, Georgia

FOR QUICK, ECONOMICAL LAND CLEARING

outwears any other type of steel. ◆ Close control during heat-treating, quenching and tempering is the secret of low carbon alloy X-A-R steels. And workability is as favorable as their hardness and toughness. Difficult problems, such as welding under cold conditions or extensive flame cutting, are handled well by X-A-R 30. For *extremely* difficult problems, choose X-A-R 15. ◆ X-A-R abrasion resistant steels, supplied in hardnesses from 360-400 BHN (or, by agreement, in lower Brinell hardnesses), are immediately available in ⅛″ to 1″ thicknesses, widths up to 72″ and lengths up to 35′. For complete technical information, write Great Lakes Steel Corporation.

X-A-R

A PRODUCT OF

GREAT LAKES STEEL

Detroit 29, Michigan

NATIONAL STEEL CORPORATION

Marsh Steel & Aluminum Co.
Kansas City, Missouri

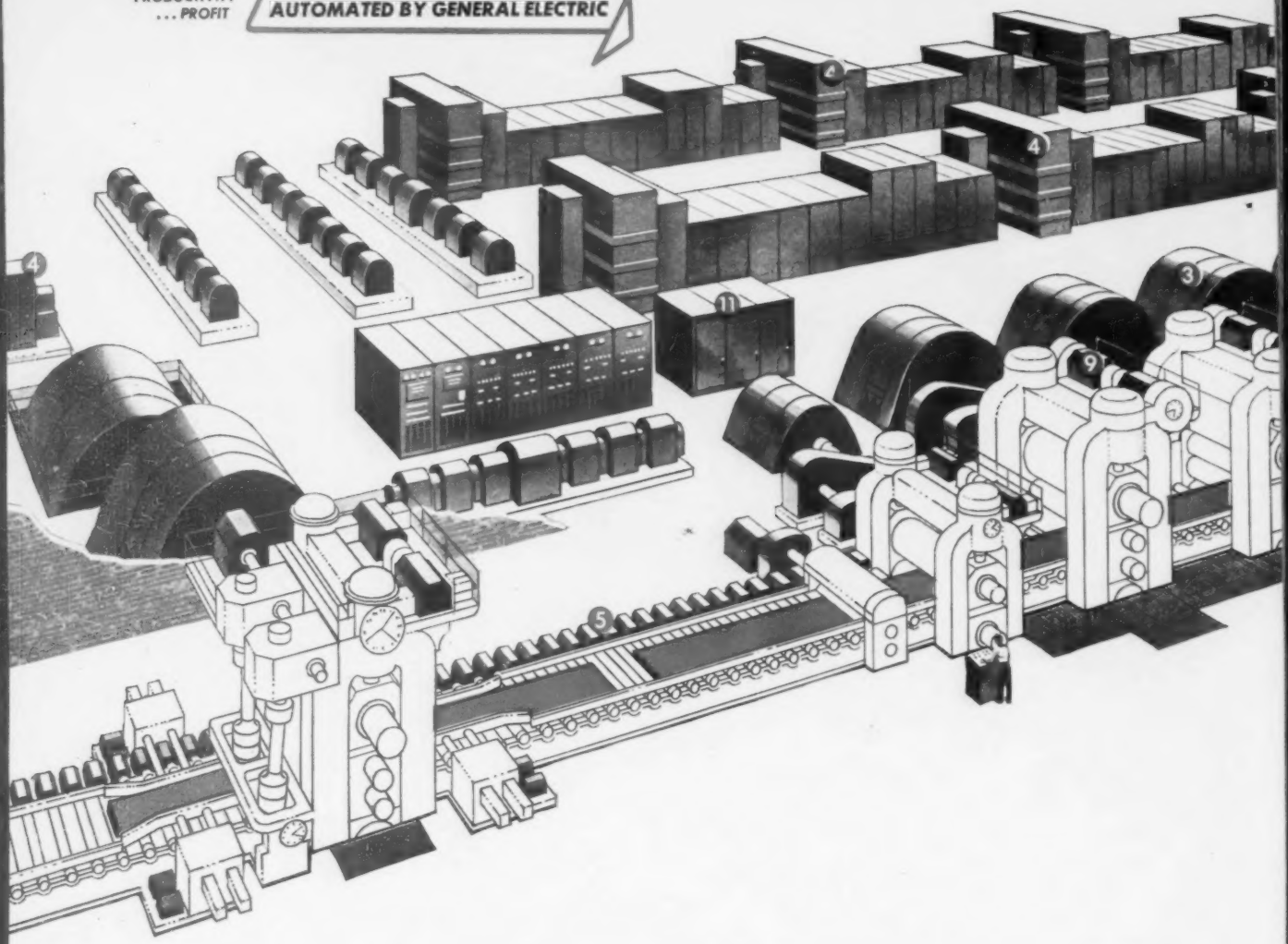
O'Neal Steel, Inc.
Birmingham, Alabama

Salt Lake Hardware Co.
Salt Lake City, Utah

A. C. Leslie & Company, Ltd.
Montreal, Canada

FOR QUALITY... PRODUCTIVITY ... PROFIT

HOT STRIP MILLS AUTOMATED BY GENERAL ELECTRIC



GENERAL ELECTRIC'S STEP-BY-STEP APPROACH TO AUTOMATION IS . . .

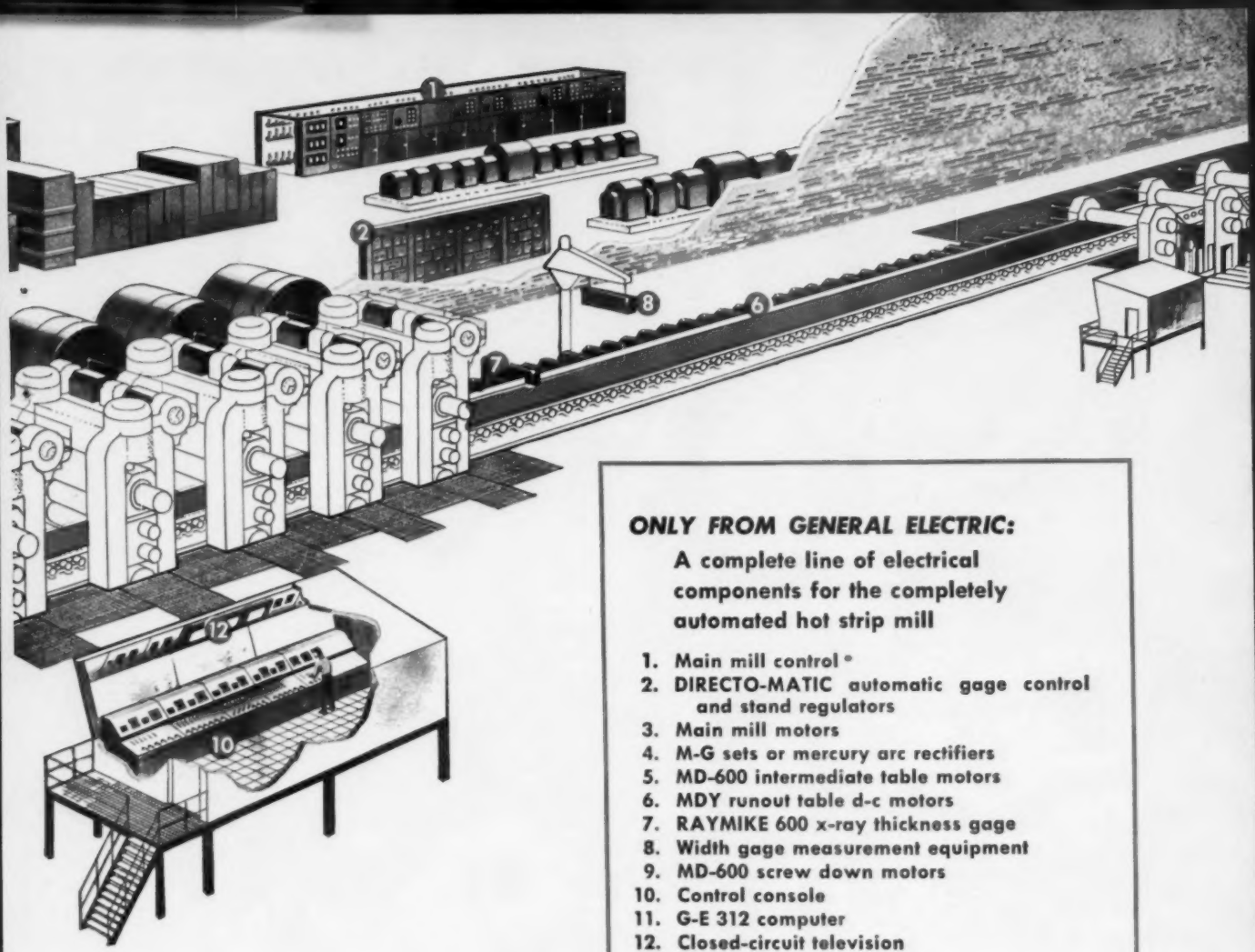
Your key to more efficient control,

EFFICIENT CONTROL and more effective utilization of production systems to meet fluctuating market trends, represents one answer to the low profit problem of undercapacity production for many primary metal producers. As a result, management has become increasingly cognizant of the benefits offered through automation of presently utilized production facilities. Meeting the demands of this trend is General Electric's planned approach to automation which combines economic soundness with predictable benefits.

WITH GENERAL ELECTRIC'S PROGRAM, critical facilities are modernized first. Then, as economic conditions warrant, a complete production area or your entire plant can be automated. Thus, by employing General Electric's logical implementation plan, greater profits are realized due to more efficient utilization of mill facilities, even though production curves decline as a result of changing market conditions.

TYPICAL BENEFITS derived from General Electric's step-by-step approach are inherent in the automation of a hot strip mill:

- **Reduction of scrap losses.** Installation of automatic gage control equipment can reduce strip cobbles as much as 27 percent, lost rolling time as much as 35 percent. Prescribed gage tolerances are met through the entire production run . . . means greater useful surface area per ton of strip produced.
- **Increased mill utilization.** Programming of each stand assures optimum performance and compatibility with adjacent operations. Operating delays and man-hours are reduced . . . mills become more efficient and greater production economies are realized.
- **Reduction in coil diversions.** More exact, continuous automatic control yields desired coils in accordance with customers' orders due to precise rolling capabilities of automated equipment. Since facilities produce only what is required, mills operating under capacity increase production efficiency.
- **Mechanical maintenance savings.** Automation reduces costly down-time and possible equipment replacement due to mechanical breakdowns and damages traceable to equipment abuse.



ONLY FROM GENERAL ELECTRIC:

A complete line of electrical components for the completely automated hot strip mill

1. Main mill control
2. DIRECTO-MATIC automatic gage control and stand regulators
3. Main mill motors
4. M-G sets or mercury arc rectifiers
5. MD-600 intermediate table motors
6. MDY runout table d-c motors
7. RAYMIKE 600 x-ray thickness gage
8. Width gage measurement equipment
9. MD-600 screw down motors
10. Control console
11. G-E 312 computer
12. Closed-circuit television

effective production and greater profit

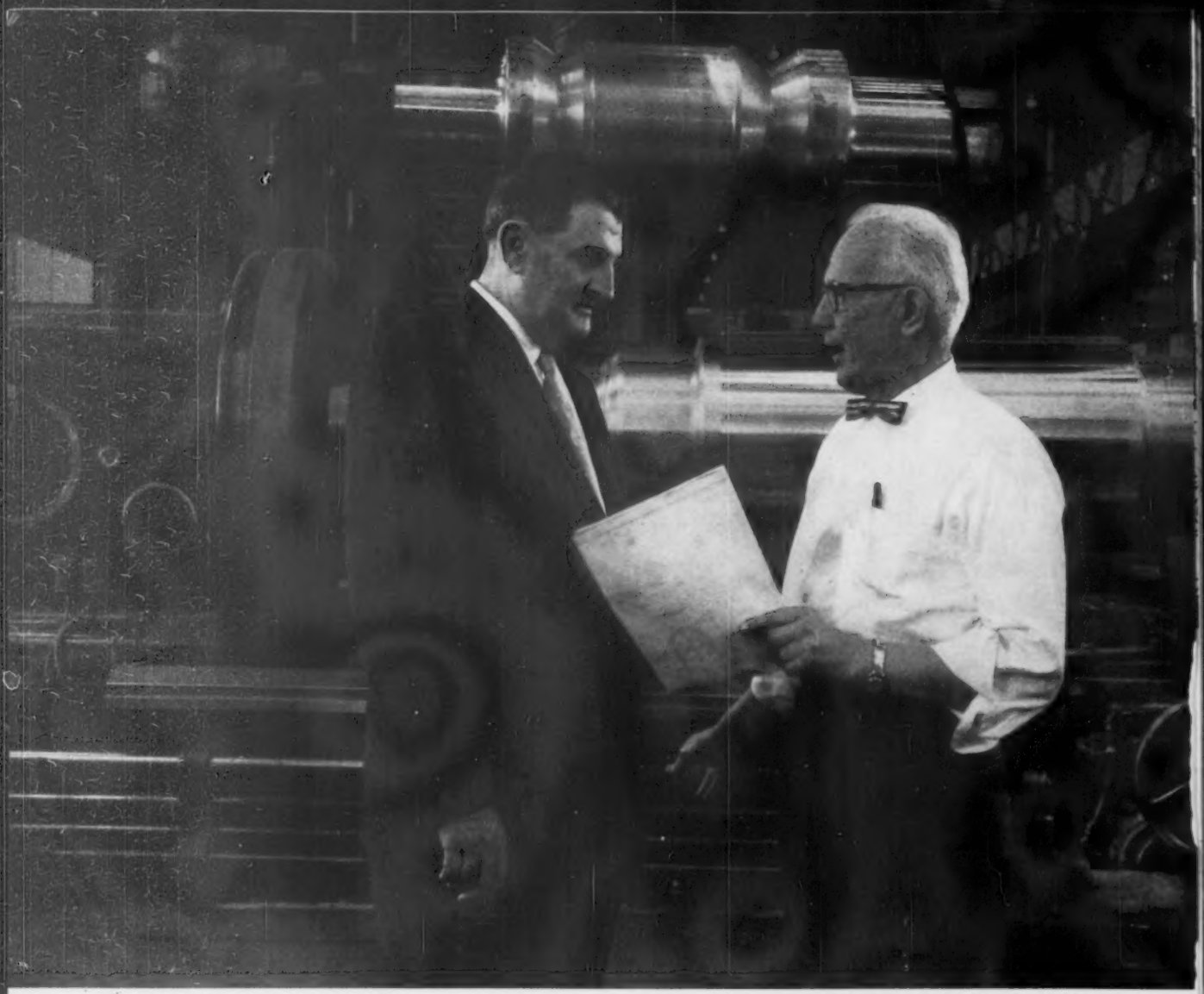
- **Improved raw material for cold mill operation.** Coils of uniform thickness minimize weld cobbles in cold mill operation, improve quality of the strip produced.
- **Increased management control.** Systems automation provides management with efficient control of manufacturing and scheduling operations. Status reports on various mill operations are readily available for effective and timely business decisions by management. Customers are assured of accurate scheduling of orders. Automated facilities permit early detection of order problems and prevent production delays which could seriously affect customers maintaining minimum inventories.

Automation of hot strip mill facilities represents but one example of what General Electric's plan can do to increase production efficiency, reduce operating costs, minimize maintenance expenditures, improve production quality and provide more effective management control—all for greater profit.

Today General Electric is ready to meet your challenging requirements for automation. Only at General Electric will you find the technology, and advanced electrical equipment capable of providing *any degree* of automation. For your key to more efficient production and greater profit through automation, contact your nearest General Electric Sales Engineer, or write, General Electric Company, Section 659-04, Schenectady 5, New York.

AUTOMATION THROUGH MODERNIZATION

GENERAL ELECTRIC



Another example of National Roll quality control

Deac Scholl, sales manager at National, discusses steel roll machining with Joe Rebar, right, roll shop superintendent.

Contour machining gives more precise shaped rolls

Some of the most impressive equipment installed in National's roll shop are the large contour lathes. Some of the largest ever made, these lathes faithfully follow the lines of carefully made templates in machining grooved steel rolls for the shaping of steel beams, rails and a multitude of other end products.

Lathes, grinders and other roll shop equipment at National have been selected specifically for the finishing of steel, iron and nodular iron rolls. A walk through this shop will convince you of the emphasis placed on quality in this phase of National's roll production.

We'd like to have you visit our modern roll producing plant at Avonmore. Failing that, we'll be glad to send you a new brochure which describes our new facilities, one of the reasons that...

National's the growing name in rolls

NATIONAL ROLL & FOUNDRY DIVISION

GENERAL STEEL CASTINGS CORPORATION, Avonmore (Westmoreland County), Pa.

General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.

STEELMAKING AT JESSOP

175,000 pounds x 150 mph = shock treatment

The powerful jet engines whine in reduced-throttle restraint as the big, sleek aircraft maneuvers gracefully in its approach pattern.

In the cockpit, the crew goes through a check list. At one point the wheels are lowered and three green lights appear, indicating the gear is in position.

Then, a moment later, the pilot eases the 175,000 pound aircraft traveling 150 miles per hour onto the concrete—safely, surely, with confidence.

Probably, the steel in the landing gear was forged by Steel Improvement & Forge Company of Cleveland. For those components that bear the brunt of the impact, Steel Improvement purchases a Macro-Clean alloy made exclusively by Jessop at its Green River plant.

Only Jessop has it, this tough, sound-centered Macro-Clean alloy that takes in stride the transverse shock imposed on aircraft landing gear.

And the excellent physical properties inherent in Macro-Clean alloys make them ideally suited for numerous other applications too—crankshafts, gears of all kinds, pellet mills, driveshafts, large bearings and oil field goods for example.

Call any of Jessop's 23 sales offices in North America for Macro-Clean aircraft and forging quality alloys and a full range of specialty steels.

Jessop Steel Company
Washington, Pennsylvania

Plants and Service Centers:
Washington, Pa. • Los Angeles • Chicago • Detroit • Owensboro, Ky. • Wallaceburg, Ont.

JESSOP

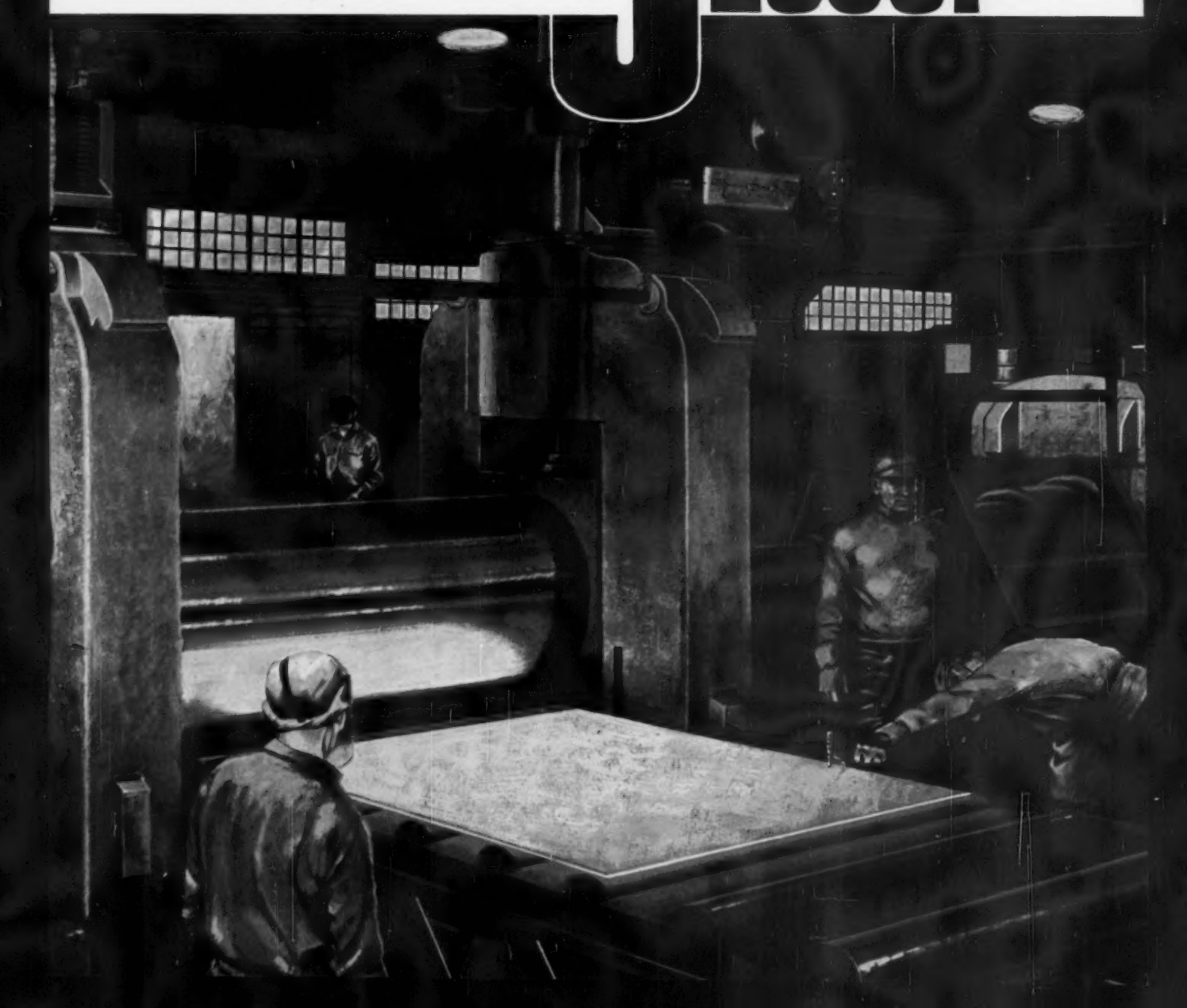


Figure both to keep your steel costs low

You can keep your steel costs low only when you look beyond steel's low initial price. Recognize how much unnecessary—and often hidden—costs of possession can add to your *final* costs. By using the facilities of your steel service center you frequently can minimize or eliminate the extra expenses of storing, handling and readying steel for use.

Each steel user's case is different. Your steel service center will be glad to help you determine the most economical way to buy steel. Figure all your costs of possession, such as:

Cost of capital:	Cost of operation:	Other costs:
Inventory	Space	Obsolescence
Space	Material handling	Insurance
Equipment	Cutting & burning	Taxes
	Scrap & wastage	Accounting

Call your nearby steel service center, or write for free booklet, "What's Your Real Cost of Possession for Steel?"

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER

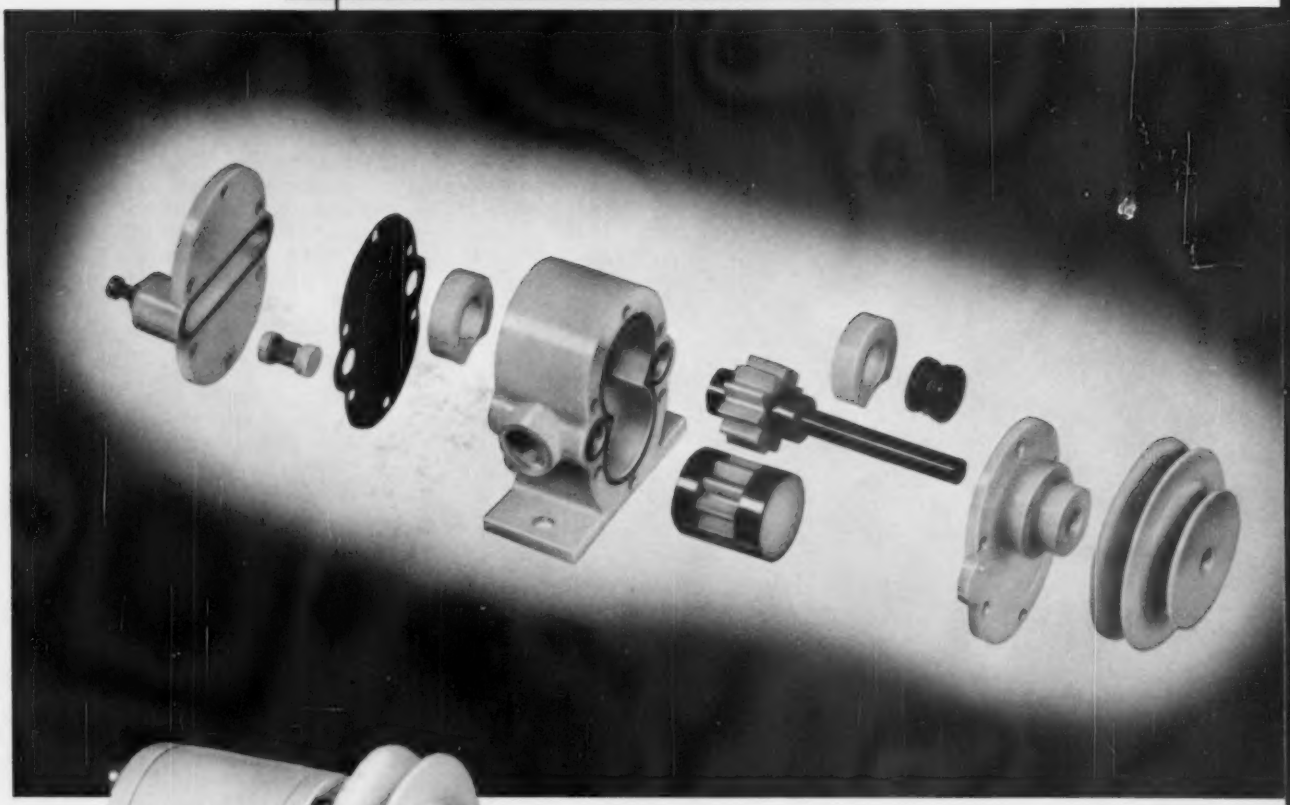
STEEL SERVICE CENTER INSTITUTE
540-A Terminal Tower, Cleveland 13, Ohio

Steel

working with

Du Pont Delrin®

one of Du Pont's versatile engineering materials



Pump parts of DELRIN® cut costs...reduce horsepower requirements

Here is a new gear pump that attains the maximum advantages of its patented design features by using Du Pont DELRIN acetal resin for all the major parts (housing, gears, bearings, cover plates, bypass valve and drive sheave). Compared with rotary pumps now made in brass and other metals, the new pump of DELRIN has better efficiency, less heat buildup, improved bearing characteristics with no lubrication, quieter operation and longer life. The manufacturer reports that the low friction of DELRIN reduces horsepower requirements as much as 50% over comparable models in brass.

In addition, economical injection molding of these parts to close tolerances—plus the elimination of expensive finishing operations—provides the greatest possible savings in pump cost. The pump parts are molded by Artag Plastics Corporation and Chicago Molded Products for Planet Products of Chicago, Illinois.

As in most applications, it is a *combination* of property advantages that makes DELRIN outstanding in performance. The different parts of the pump depend, in varying degrees, on such properties of DELRIN as: high strength, stiffness, creep resistance, corrosion resistance, non-lubricated bearing characteristics, low friction, dimensional stability, abrasion resistance and excellent fatigue life while subjected to a range of temperatures and environments.

On the following page, you'll find more examples of how these properties are being used to improve the performance and lower the production costs of a variety of pumps. The details may well stimulate your thinking about the advantages of DELRIN for *your* products.

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BETTER THINGS FOR BETTER LIVING THROUGH CHEMISTRY

working with

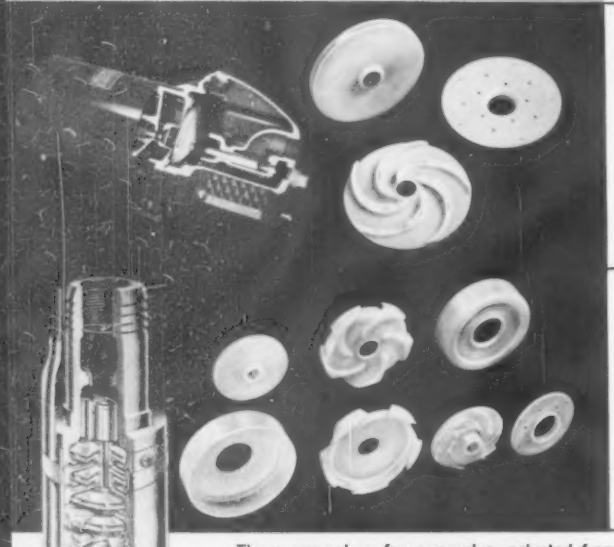
Du Pont Delrin®

one of Du Pont's versatile engineering materials

How parts of DELRIN® improve pump performance

WALKER lubricator uses DELRIN for the pumping unit of a new improved central lubricator for vehicles. Here the high temperature strength of DELRIN is a prime requirement—the pump body must withstand under-the-hood temperatures up to 250°F. Pump body, cap, check valve and tube connector are all economically injection-molded of DELRIN. They meet the exacting mechanical requirements for the pump in addition to providing major savings in manufacturing costs. (Molded by G. Felsenthal and Sons, Chicago, Illinois, for Walker Manufacturing Co., Racine, Wisconsin.)

CLAYTON MARK jet pump has an improved volute housing and venturi assembly of DELRIN, replacing the former combination of cast iron and brass, and offers significant advantages in both cost and pumping efficiency. Creep resistance, abrasion resistance and dimensional stability, even under elevated temperatures, are necessary here. The two parts of DELRIN are easily and economically joined by spin welding. (Molded by Chicago Molded Products, Chicago, Illinois, for Clayton Mark Company, Evanston, Illinois.)



RED JACKET "Trailblazer" jet pump uses new injection-molded impellers of DELRIN, because these parts give superior performance over comparable models in brass through increased efficiency, greater abrasion resistance, reduced mineral buildup and longer life. In addition, the use of DELRIN resulted in a 35% saving in impeller costs. (Molded by Chicago Molded Products, Chicago, Illinois, for Red Jacket Manufacturing Company, Davenport, Iowa.)

RED JACKET "Custom Submerga", a new submersible pump, uses DELRIN to achieve new high standards of performance and dependability. In each of the stages, DELRIN replaces brass for the impeller, bowl and diffuser. The fatigue endurance, strength and resistance to creep and corrosion of DELRIN are particularly valuable. According to the manufacturer, precision-molded parts of DELRIN provide an 85-90% cost saving over comparable parts in brass.

These are only a few examples, selected from one particular field, of the many ways in which DELRIN is improving designs and effecting economies in hundreds of applications across a broad range of industries. Why not translate the cost and performance advantages of DELRIN acetal resin in terms of your product? Mail the coupon below for further information.

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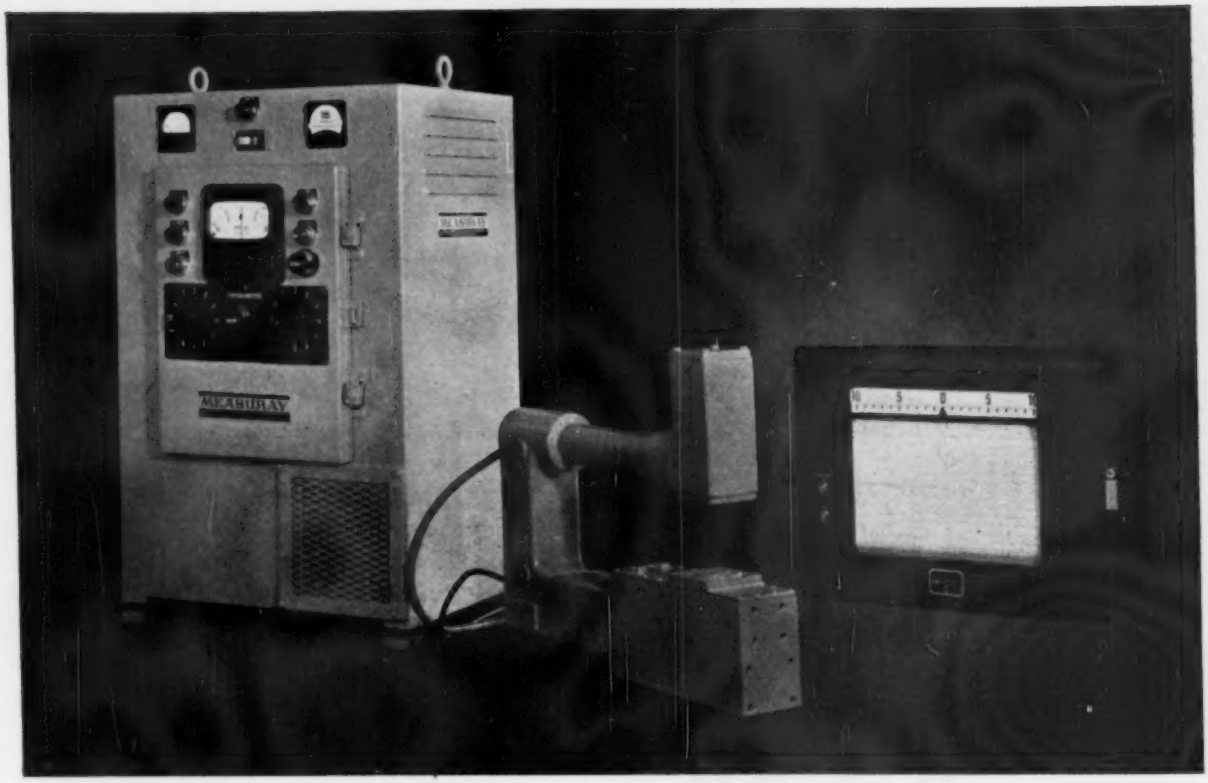

New Micro-Sec Pulse circuit speeds up X-ray thickness checking with MEASURAY® gages

Increased speed of response up to 50 times faster than conventional X-ray gages and beta ray gages, is made possible by Sheffield's new Micro-Sec Pulse circuit.

Also, this permits focusing the beam as narrow as .040" wide. For the first time, striations or grooves as close together as $\frac{1}{16}$", can be defined in foil, plastic sheet or film, without sacrifice of speed of response. Changes in the thickness of material being gaged are detected instantly and the amount read with great accuracy.

Measuray non-contact gaging enables you to measure materials in motion, up to very high temperatures, without touching. Ferrous and non-ferrous hot and cold rolling mills; producers of plastic sheet and film, foil, and paper are using Measuray non-contact X-ray gages to keep their costs competitive.

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OUTSIDE...

It's literally true that Stainless Steel trailers do not wear out before they become obsolete. Some of them have logged over a million miles. Once, a load of lampblack in a Stainless trailer caught fire and burned for five hours. Wheels, bearings, brake linings, drums (and cargo) were completely destroyed. They were replaced and the trailer body is still in service.

Water, harsh marine or industrial atmospheres can corrode and rot trailer bodies of other materials. Not Stainless. And Stainless Steel is strong—it has a yield point almost four times greater than competitive materials, so Fruehauf engineers (who designed this trailer) can design thinner, lighter walls, roof and braces. Strength goes up, and so do payloads and profits. Maintenance costs go down. The trailer shown here is 40 feet long, is built of type 302 Stainless, and is the strongest, lightest trailer in its class.

INSIDE...

In Philadelphia, 270 sleek new Stainless Steel subway-elevated cars are in process of going into service, with more than 100 already running. Manufactured by The Budd Company of types 201 and 202 Stainless, they were designed to win new riders to mass transportation, yet they will be cheaper to operate and maintain than any similar rapid transit cars ever built.

These cars will be exposed to all kinds of atmospheres—from the dampness of the underground tunnels to the sleet, rain, snow or hot sun above ground. But they'll always look new and shiny—because they're Stainless Steel. A quick hosing-down will keep them looking that way, and costly painting will be eliminated because Stainless Steel keeps its good looks. And the Philadelphia Transportation Company will save in other ways too: since these new cars weigh only 49,000 lbs., it won't take as much power to run them. Savings in maintenance and operation will add up to some $6,500,000 over the 30-year depreciated lifespan of the fleet.

...and in between

Only Stainless Steel offers designers and fabricators this unique combination of properties: great strength, extraordinary corrosion resistance to an enormous variety of reagents, outstanding high temperature properties, and good appearance. It is easily fabricated, and it actually costs less in the long run because it lasts longer. For unmatched efficiency, durability, ultimate economy, specify Stainless Steel. For a wide selection of Stainless Steels and for prompt delivery ask your USS representative or nearest steel service center.

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Get all the details on how Screw and Bolt's packaging partnership plan can work for you. Write "Packaging Service, Screw and Bolt Corporation of America, Southington, Connecticut." You'll be glad you did.

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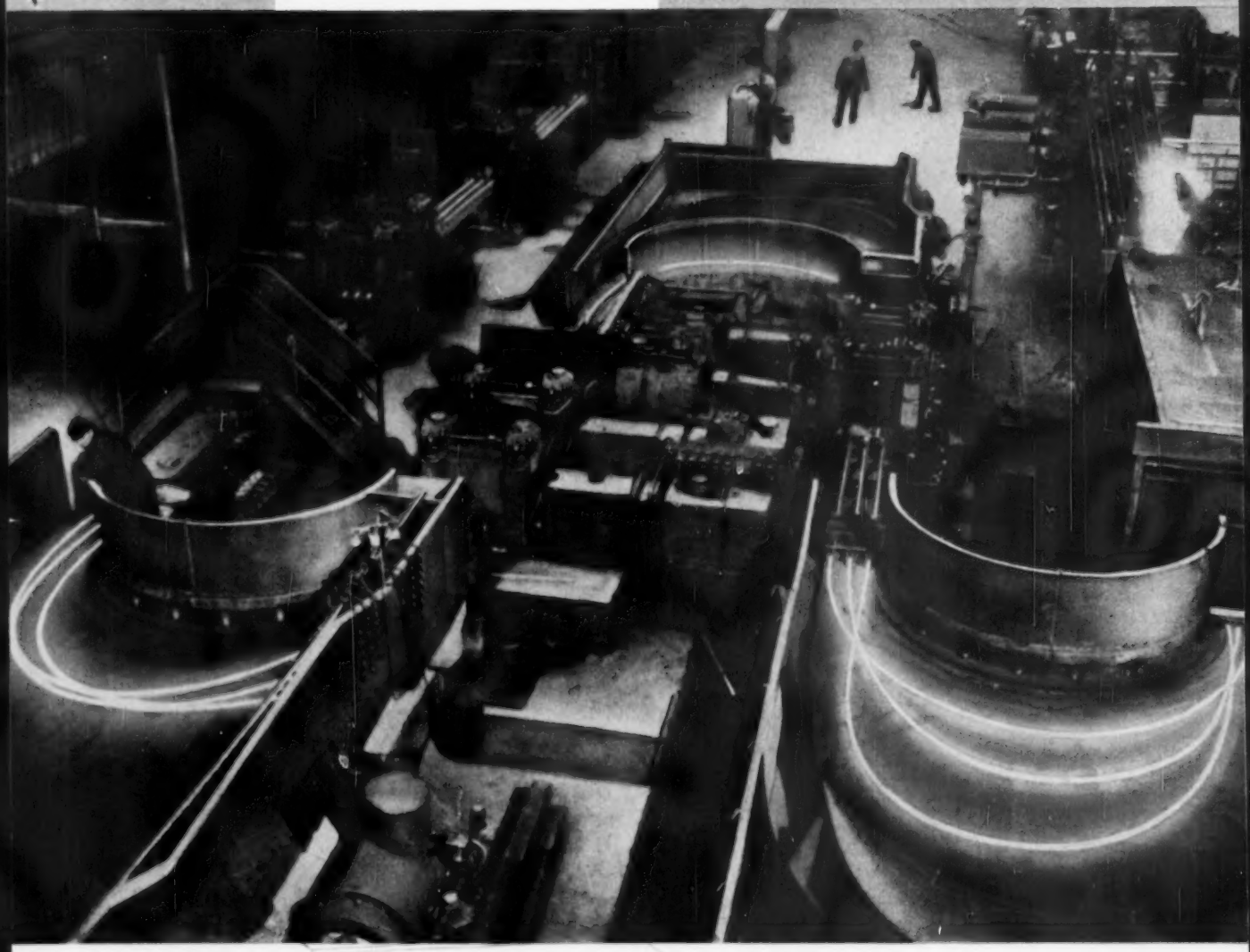

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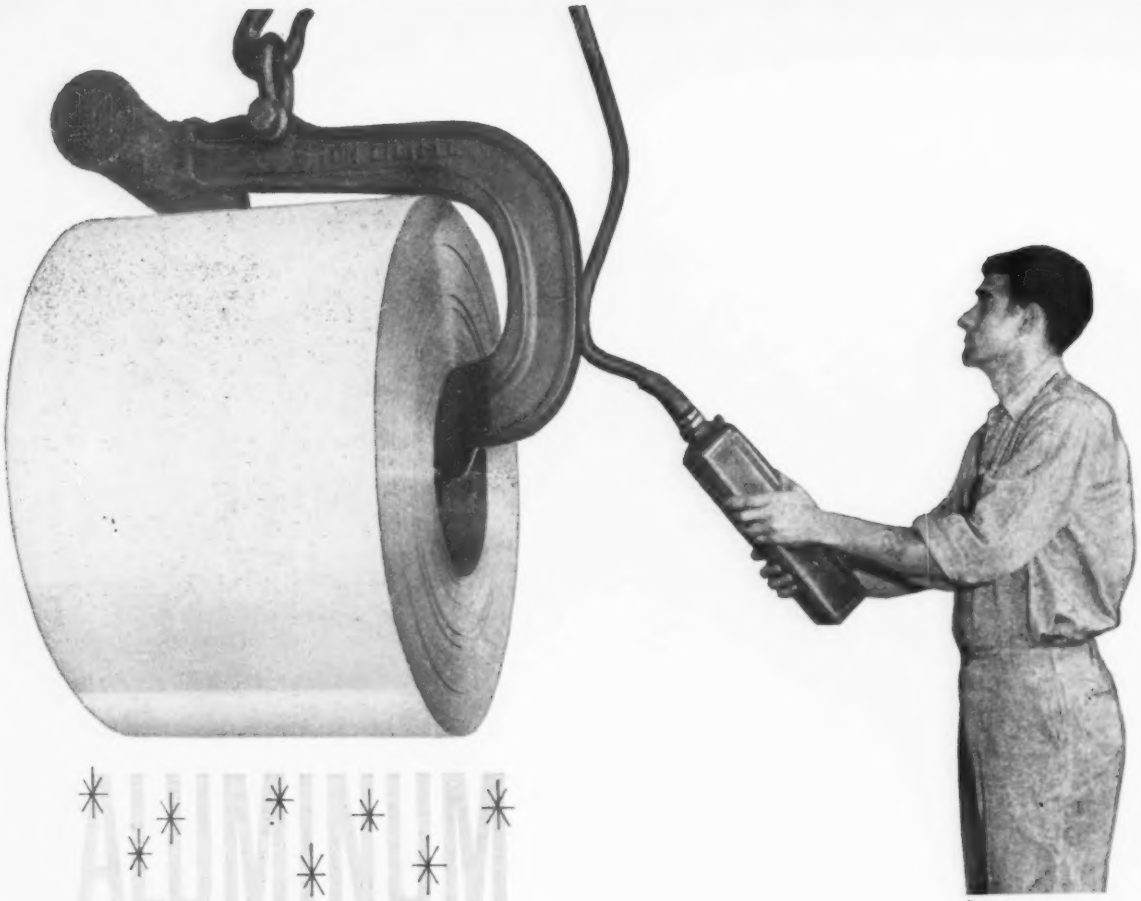


Photo courtesy
LITHO-STRIP CORP.

Bonderized and painted coil...

a revolution in product quality and performance

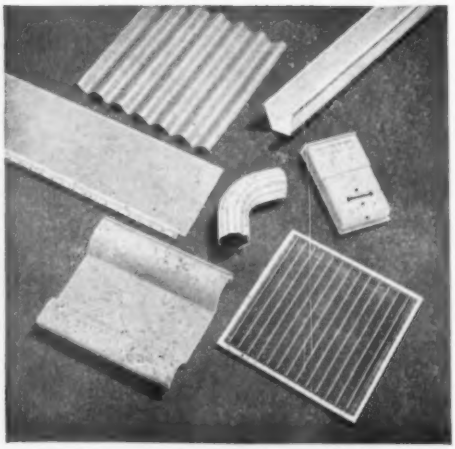
Bare aluminum enters the finishing installation and is cleaned. Bonderized and roll coat painted in continuous automated operation. Re-coiled, it's ready for forming into any one of dozens of products.

This is the most efficient, effective and economical method for painting aluminum. Straight-line production is utilized, labor and material costs are reduced, quality is maintained and the performance of the finish is spectacularly increased.

Paint adhesion over the Bonderite coating is so strong that it permits the most severe forming operations without peeling or failure.

Service life of paint over Bonderized aluminum—5 to 10 times that on untreated aluminum—assures product performance and customer satisfaction.

Aluminum, Bonderized and painted in the strip, is being used in huge tonnages today. Better investigate its economy and advantages for your production. Call in the Parker representative now!



Typical products formed from aluminum, Bonderized and painted in the strip.

Parker Rust Proof Company
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BONDERITE corrosion resistant paint base • BONDERITE and BONDERLUBE aids in cold forming of metals • PARCO COMPOUND rust resistant • PARCO LUBRITE—wear resistant for friction surfaces • TROPICAL—heavy duty maintenance paints since 1883

Since 1914—Leader in the field

*Bonderite, Bonderized, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

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Clean

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Stainless Steel is the spotless metal for preparing the food you eat and serve. In protecting the health of your family there is no substitute for clean, corrosion-resistant Stainless Steel.

Look for the **STEELMARK** on the products you buy.

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McLOUTH STAINLESS STEEL

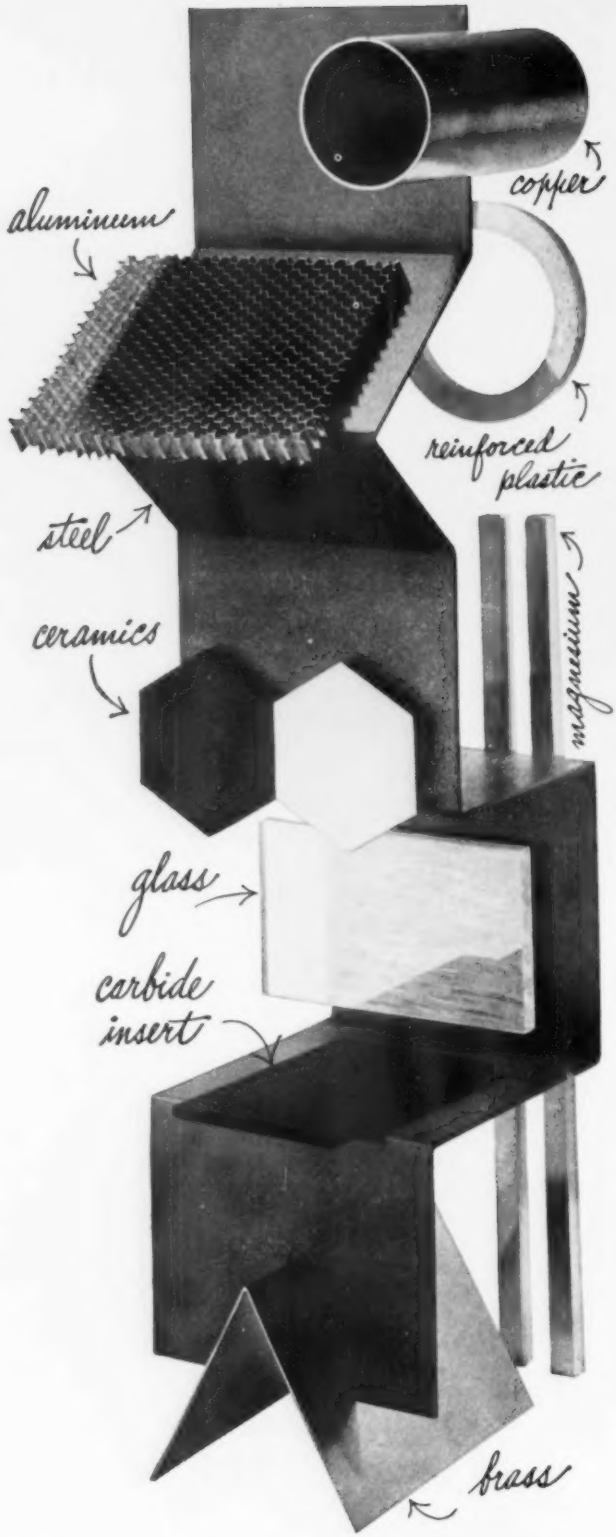
WHAT DO YOU WANT TO BOND TO WHAT?

Take a structural material—for instance, any of the materials shown to the right. Want to join it to itself or another material? Then chances are that SCOTCH-WELD® Brand Structural Adhesives are your best fabricating answer. This modern high strength method of joining materials permits improved design and production techniques . . . cuts costs . . . offers unique benefits.

For example: Smoother contours result when mechanical fasteners are eliminated. Fabricating complex shapes—often impossible or too expensive with ordinary fastenings—is made easy and economical with SCOTCH-WELD Adhesives. In fact, costly complex castings can often be replaced by two or more inexpensive simple castings bonded together with SCOTCH-WELD Adhesives. And lighter gage materials may be used where desired, since stress is spread over a wide area. Often, too, inspection and production steps can be eliminated. Another benefit—unusual combinations of materials which can be joined in no other way can be bonded perfectly with SCOTCH-WELD Adhesives.

Throughout the metalworking industry, bonding with SCOTCH-WELD Brand Structural Adhesives is improving quality, speeding production and cutting costs.

SCOTCH-WELD Adhesives may be the answer to your design and production problems . . . and improve your product at the same time. For full information write on your company letterhead, outlining area of interest, to: AC&S Division, 3M Company, Dept. SBQ-100, St. Paul 6, Minn. "SCOTCH-WELD" is a Reg. T.M. of 3M Co.



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IN CANADA: Federated Metals Canada, Ltd.
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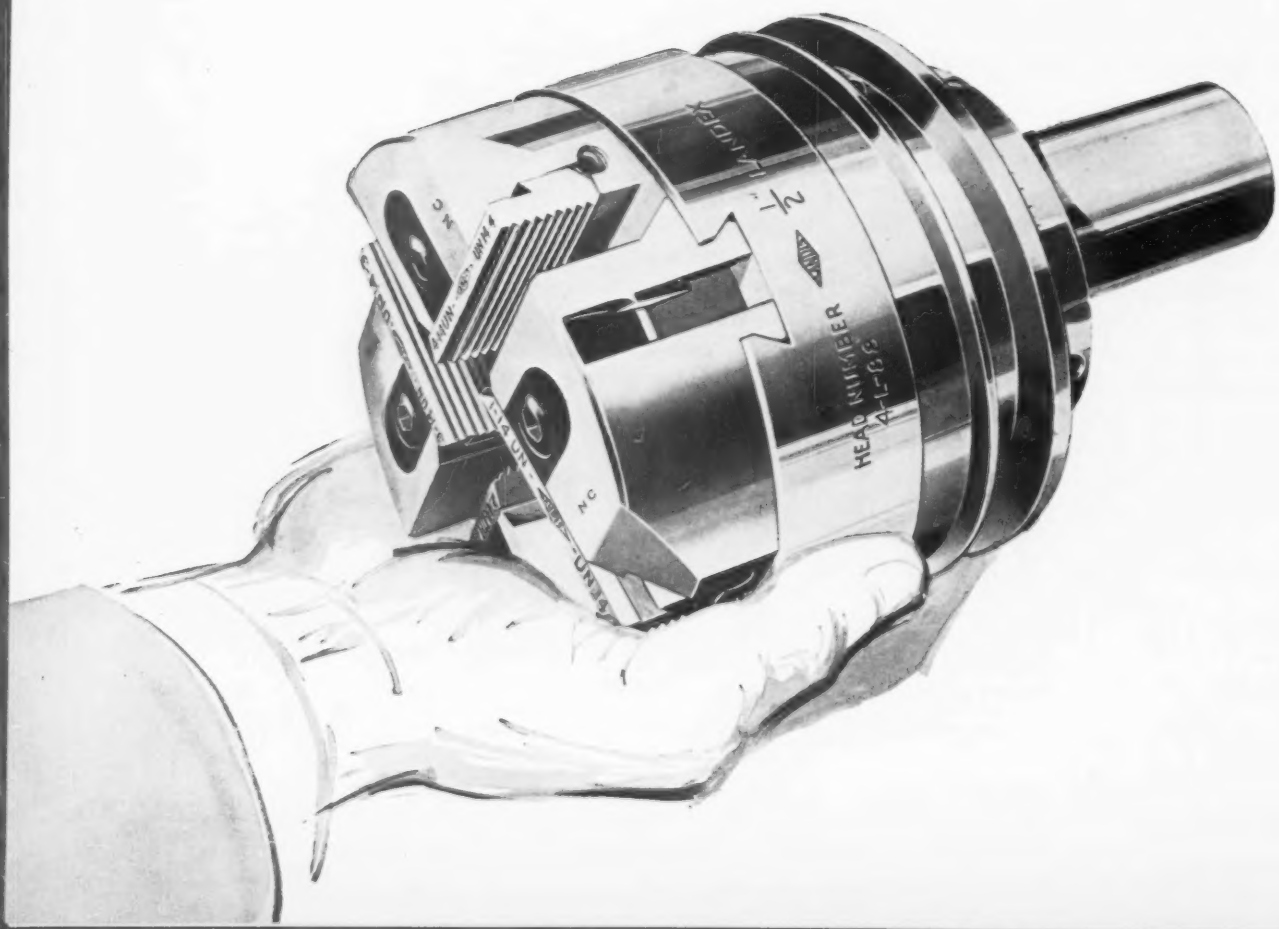

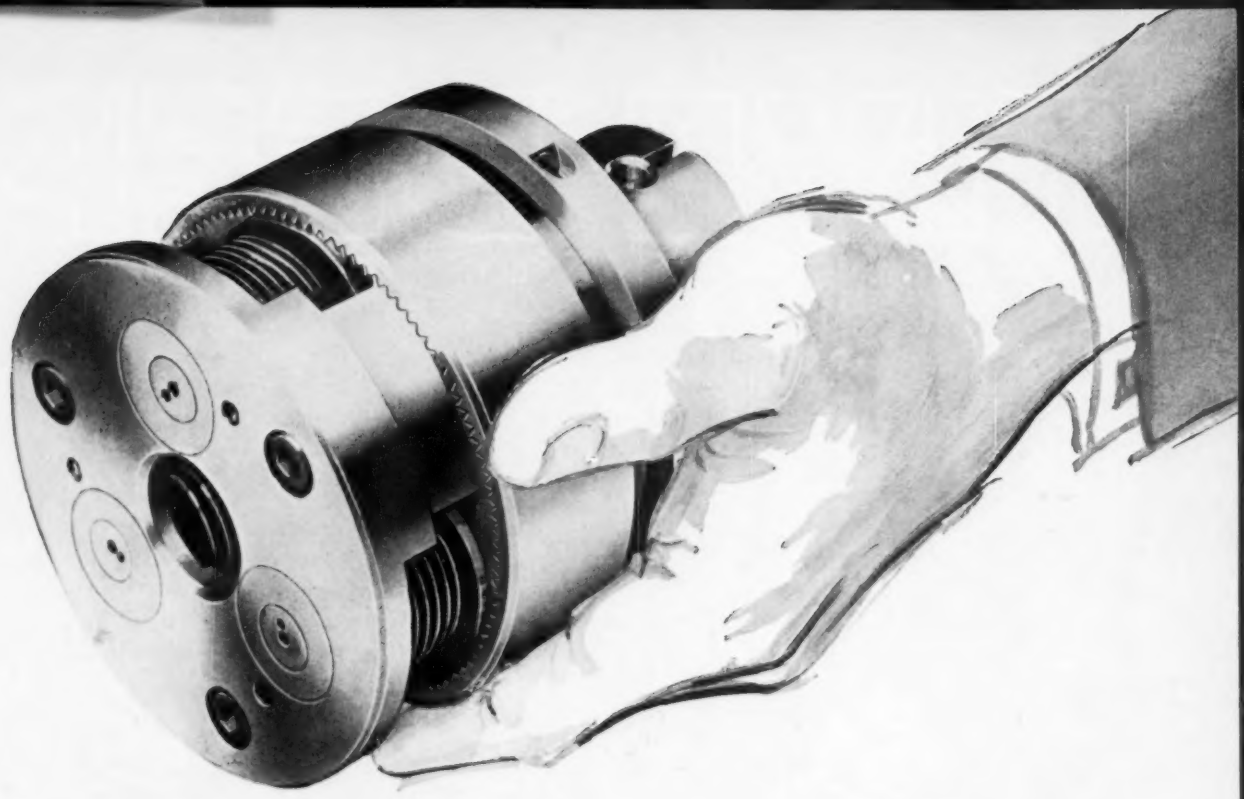

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You—as a metalworking manager—constantly face such decisions. Your answers are measured in terms of product cost, and require reliable information on relative output, tool cost, downtime, etc.

Providing you with such information is an important function of your LANDIS Representative. He is a trained Threading Engineer. He was scientifically selected, trained in our plant, and served an extensive field apprenticeship. His personal ability is backed by fully-staffed Engineering and Research facilities, and more than 50 years of knowledge and experience accumulated as Threading Specialists.

Whether you need data on which to base a buying decision—or help in developing special tooling for a particular threading operation—contact your LANDIS Representative. He can offer you a machine or tool from the most complete line in the world to thread by Cutting, Rolling, Tapping, or Grinding.

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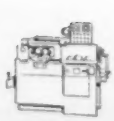

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Millions in technology

help you profit with UCM's "FIVE-DEEP" Ferroalloys

1 **Technology**—many million dollars a year, invested in UCM's 600-man research and development center—helps you produce better, more profitable metals. This is one of the 5 intangible but ever-present extra values of Union Carbide Metals' FIVE-DEEP alloys.

It has brought you more than 100 new alloys and metals designed to give you production economies and improved products. Countless millions have been made and saved because of UCM's research, along with these 4 other extra values:

2 **Customer Service** brings you our integrated experience in the application of ferroalloys to various melting practices. Engineers from 9 UCM field offices travel a million miles a year to provide on-the-scene assistance.

3 **Global Ore Sources** assure you uninterrupted supplies of ferroalloys. UCM's close association with world-wide mines provides dependable raw material sources.

4 **Unmatched Facilities** free you from delivery worries. Only UCM gives you 6 plants—3 with their own power facilities—and 17 warehouses, all located for fast shipments by rail, truck, or water.

5 **Strictest Quality Control**—with over 100,000 tests per month from mines to shipment—makes sure you always get alloys of uniform size and analysis, with minimum fines, lot after lot.

For better metals, production economies, bigger profits, insist on UCM's FIVE-DEEP alloys. Union Carbide Metals Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y., producer of "Electromet" brand metallurgical products.

"Union Carbide" and "Electromet" are registered trade marks of Union Carbide Corporation.

UNION CARBIDE METALS

Only **ELECTROMET** ferroalloys from **UCM** are so deep in extra values to help you.

PRODUCTION OF COMPACTS HITS ALL-TIME HIGH for a week in the second week of October. A total of 48,200 compacts were produced. Total U.S. auto production hit a 9-month weekly high of 162,000 units. Overtime work is expected to top these marks soon.

RESEARCH KEEPS THE ORDERS COMING IN. A spot check of companies that are running against the tide in a generally poor business year indicates that a high percentage of them have aggressive, well-equipped research teams. Needed new products pay off.

A MAJOR CHANGE IN SCRAP PROCESSING is forecast by the president of a large machine tool company. The executive says that scrap processing will be concentrated in large, automated yards 10 years from now. Rising labor costs and new quality demands will bring greater mechanization that may prove too costly for small yards.

CONSUMERS ARE "VALUE STARVED," says builder William J. Levitt, after selling $5 million worth of homes in one week in his new Belair, Md., development. In pointing to his own success in selling air-conditioned houses for $17,000, Mr. Levitt contends that customers will still line up for U.S. products when "offered more value for their dollars."

MORE ELECTRONICS, LESS ELECTRICAL is the trend in some electrical equipment companies. Already a quarter of the total business of No. 1 electrical equipment maker, GE, is in the field of electronics, according to board chairman, Ralph Cordiner.

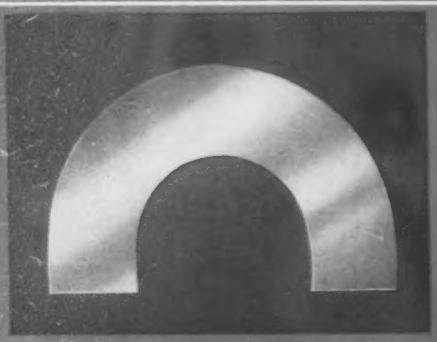
A COMPANY MUST BE CUSTOMER-ORIENTED, NOT PRODUCT-ORIENTED, writes Theodore Levitt in Harvard Business Review. Citing an example in railroads, Mr. Levitt points out that railway men became product-oriented instead of customer-oriented. Today they would be in trucking, bus transportation, and airlines, except for this executive attitude. Companies stop growing not when the market is saturated, but when management is, he says.

NICKEL IS EXPECTED TO SCORE A BIG JUMP in stainless steel consumer products this year. Sales of these products at the retail level will exceed $.5 billion, predicts L. R. Larson, International Nickel's vice president and general sales manager. This would be up to 10 to 15 pct over 1959.

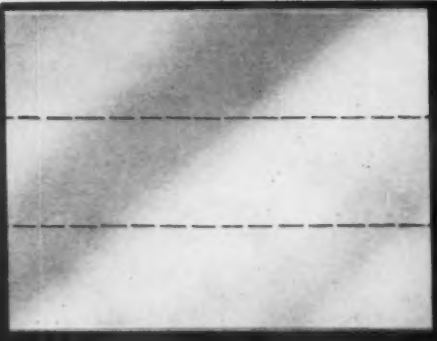
*$100.00 per part production SAVINGS.....

...with the BATH METHOD

OLD METHOD



Cutting out the blank in this titanium piece was not only tough, but material waste is evident.



3 titanium parts per piece instead of one.

Drop Hammer operation resulted in heavy scrap loss.

Radial Draw Forming prior to Drop Hammer operation eliminated metal distortion, greatly reduced rejects.

Finished part

Finished part

*The illustrated titanium part was not only expensive to make by old methods, but because of metal distortion, the part reject loss was tremendous. By STRETCH RELIEVING the titanium, using a Bath Radial Draw Former, part rejects were practically eliminated . . . in short, a method of forming shapes that keep their shape . . . even after heat treating . . . *Send for the plant facilities folder, it illustrates both the standard Radial Draw Forming facilities, plus a completely new series of HIGH SPEED production forming machines.*

THE CYRIL BATH COMPANY

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(LOCATED IN THE GREATER CLEVELAND AREA)
Manufacturers of Radial Draw Formers • Dies • Tools • Press Brakes • Tangent Bending Sequence Presses • Press Type Brakes • Special Machines

Planning and Research Can Help Meet Industry's Water Needs

Demand for industrial water is expected to double in next 20 years, could almost double again in 20 years after that.

But greater re-use of present supplies, research to find new sources, and advances in manufacturing will help avoid shortages.—By P. J. Cathey.

▪ Like man, industry can't survive without water. And as its water needs increase, so do its water problems.

In the next 20 years, government experts say, the daily water needs of major industrial users will more than double. In forty years they will be almost four times what they are today.

Yearly water intake of the iron and steel industry could more than double by the year 2000. For the aluminum industry it is expected to increase more than four times present intake. (See charts, this page and next.)

No Shortage—All this does not mean that industry—or the nation—faces a near-term water shortage. Nor is one likely in the forseeable future. It does mean industry must give more attention to both its water sources and its water costs.

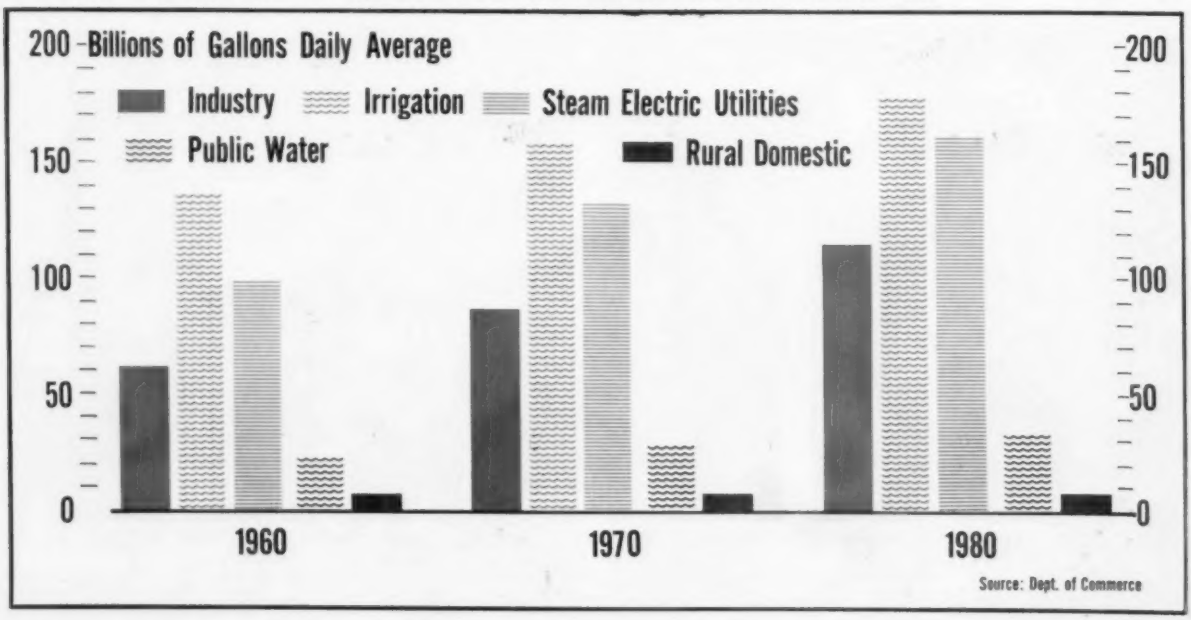
With this in mind, water researchers such as those at Carrier Corp. and American Machine & Foundry Co., are working to make sure there's a continuing supply of usable water.

Various projects are underway. But one of the most promising involves tapping the largest water source in the world: The sea. Next month Carrier will put in operation a pilot plant at Wrightsville Beach, North Carolina. It's designed to produce 15,000 gallons a day of fresh water from salt water. The process: Seawater is taken into tanks and frozen. This produces a slush of pure ice crystals and brine. The brine is then removed and the ice melted to get fresh water.

Pilot Project—The Wrightsville plant is a pilot unit being built and operated for the government's Office of Saline Water. It is one of several freezing methods of sea water conversion under study.

Carrier water researchers are enthusiastic about the method's commercial potential. Says Dr. J. F. Downie Smith, president of Carrier Research and Development Co.,

How Nation's Use of Water Will Grow



who's in charge of the program:

"We are optimistic that the freezing process will be the least costly for the conversion of salt water. On the basis of present experience we think we will come well within the government's objective of obtaining water at less than $1 a thousand gallons. We will be better able to predict a cost figure after the assignment has been carried out. Experiments at the Wrightsville Beach plant will show more fully the design needs for a large-volume demonstration-production plant."

One of Five — The freezing method is one of five being investigated by the Office of Saline Water, with funds voted by Congress. The others are: Evaporation, flash distillation, vapor compression, and electrodialysis (separating salt from water by forcing it through special membranes with the aid of electric current). A demonstration plant for each of the five processes will be built by the government, three to handle salt water, two for brackish water.

American Machine & Foundry is commercially developing two types of saline conversion — distillation and electrodialysis and working on other methods. Its Maxim Div. has long been active in the field, developing advanced evaporators for distillation of salt water for the U. S. Navy's atomic submarines and other naval and marine vessels.

The Right Answer — Hamilton Herman, AMF vice president and director of research and development, believes technology holds the key to continued water supplies at economical costs.

"Costs of conversion processes," he says, "must be measured against tomorrow's water costs—not today's. As the water situation becomes more critical, and this will come gradually, not all at once, industry will move to meet—and solve—it. The methods used will depend on the industry, its water needs, and its cost position."

He points out these are some of the questions a company will need to answer: What is the water being used for? What degree of purity is needed? How much water is taken in each day? How much is consumed? What requirements does the community place on keeping the area's water free of pollution?

In some cases, it may be worthwhile to find out if processing can be done without water, or with a reduced amount.

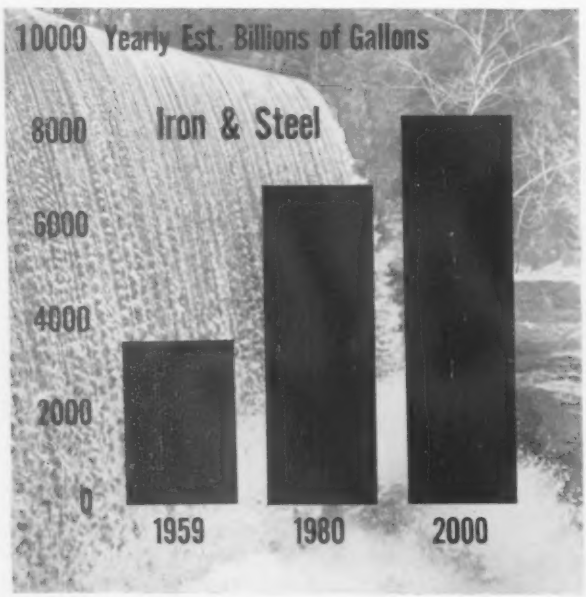
Requirements—If equipment to convert salt or brackish water is needed, additional questions must be answered. AMF engineers say the method selected will depend on the capacity of the plant, the salinity (salt content) of the water handled and the type of energy available for fuel.

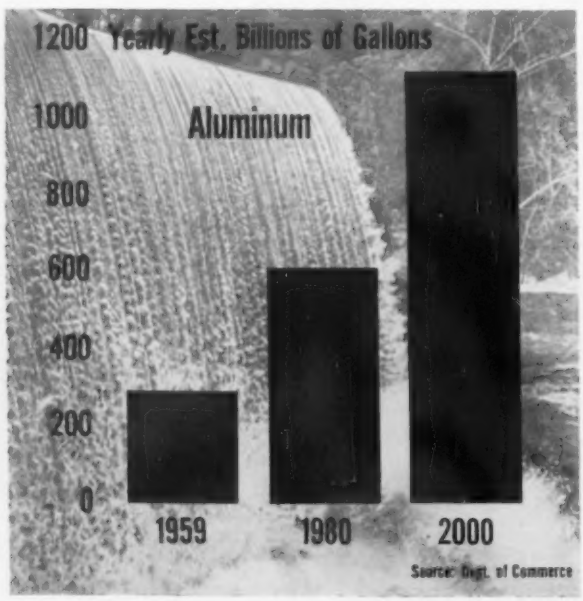
Long before the amount of water becomes a problem, its pollution will push industry into added water costs. This is already happening as community and area pressures build up.

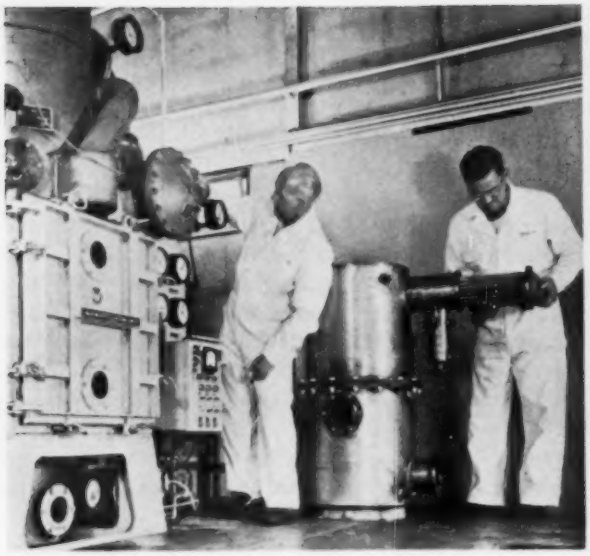
Big Job—Irving K. Fox, associate director, Resources for the Future, Inc., declares: "In view of the mounting volume of wastes produced by industries and cities because of production and population, the job of preserving reasonably clean water courses is a large order. In dealing with water through policy, planning, development and research, the pollution problem is destined to move to the center of the stage."

Commenting to The IRON AGE on water pollution control plans, Walter L. Picton, director, Water and Sewerage Industry and Utilities Div., BDSA, says: "The object of this program is cleaning up our

Big Increase Coming in Metal's Water Use







EXPERIENCE: In designing water converters, American Machine & Foundry Co. can rely on experience gained in producing this 8000 gallons per day desalinization unit for shipboard use.

WATER MAKERS: Controls for Carrier Corp. plant to make water from the sea is checked by Dr. A. L. Miller (l.), director, Office of Saline Water, Int. Dept. and Dr. J. F. Downie Smith, Carrier vice president.

streams through adequate municipal treatment plants and industrial liquid waste treatment plants. Some progress is being made. However, there's a lot more to be done."

Industry can aid by salvaging and reusing waste water — especially where, or when, water supplies are limited. Bethlehem Steel Co. at its huge Sparrows Point, Md. plant is showing how this can be done. With an annual capacity of 8.2 million tons of steel, the plant's water needs are immense. Every day it requires 100 million gallons of industrial water, 15 million gallons of fresh water, and 540 million gallons of salt water.

Reclaimed Water—Some of these needs are met by taking about 120 million GPD of sanitary sewage water from two treatment plants of the city of Baltimore. Bethlehem adds chlorine at two points and uses the water throughout its plants for cooling and air-conditioning.

Another metal producer—Kaiser Steel—has drastically dropped its water use per ton of steel through recirculation.

Greater use of recirculation will help industry reduce its water intake. Government water experts point out recirculation equipment now in use has cut industrial water intake nearly in half.

But this adds to water costs as equipment is installed. And in the long-run, water re-use will gradually increase the amount of water industry consumes. Present estimates show industry consumes about 15 pct of water it takes in. With increased recirculation, this percentage will rise.

Another influence—technical advance—may change metalworking's water needs in the years to come.

Percentage Drop—According to Carl W. Messinger, director, Iron and Steel Div., BDSA, water use per ton of steel will probably decrease by 10 pct between now and 1980. An additional 10 pct drop will come from 1980 to 2000.

Some of the probable reasons as outlined by Mr. Messinger: The trend toward direct reduction of iron and oxygen steelmaking (both processes require less water per ton), arrival of continuous casting as an important production process, more use of purchased power by steelmakers, and greater recirculation of water.

Needs to Rise — Overall, of course, steel industry use of water will show substantial increases over current needs in 1980 and 2000.

Because of growing use of imported iron ore, the greatest future growth for steel will be near tidewater areas, both in the coastal regions and along the Great Lakes. The industry's water demands should be less in river basin regions, especially in the Ohio River area.

For another industry—aluminum—greater use of recirculation will reduce water intake per ton. But, again, the total water use will climb.

Location Problems—Right now, a major factor in locating aluminum reduction plants is the cost and availability of electric power. A postwar trend to hydroelectric generation of power (as in the Pacific Northwest) has shifted. Now the trend is toward using natural gas and coal to generate electricity.

Eastern Waters—The copper industry can use a large volume of brackish water. Because of this, the largest copper industry water users are located in the Delaware and Hudson River regions.

Future expansions in the copper refining industry will be away from the interior of the U. S., according to the Copper Div. of the BDSA.

Will Others Adopt GE's Tactics?

Success Could Bring Major Bargaining Changes

GE's success in its negotiations with the IUE could cause other companies to try similar bargaining tactics.

The question is whether or not they would be as successful.—By G. J. McManus.

■ Has General Electric Co. pulled the string on a wave of change for all labor relations?

This question was raised by the success of GE's strong stand against the strike called Oct. 1 by the International Union of Electrical Workers. (For terms of GE and Westinghouse settlements, see Metalworking Labor, p. 9.)

Lacked Support — From the start, other unions declined to form a solid front with IUE. United Electrical Workers continued on the job under an automatic contract extension.

By the third week, the company said, local agreements had been negotiated for 75 pct of the employees in machinist unions and 90 pct in automotive unions. And GE said nearly one-third of the 70,000 IUE members had returned to work; 195,000 of the company's 240,000 employees were working.

It was evident last week that GE was close to victory. A significant number of union members went against union leadership.

IUE president James B. Carey blamed the return-to-work movement of 8700 member Schenectady Local 301 for weakening the union's bargaining position.

Encourages a Stand — Labor relations men say GE's success is bound to have a powerful impact on all industry.

"I believe it will encourage companies with declining profits to take a stronger stand against demands they consider excessive," says Nicholas Unkovic, a top labor lawyer and partner of the Pittsburgh firm of Reed, Smith, Shaw and McClay.

Mr. Unkovic added: "When it comes to a question of survival, companies will take their cases not only to the unions but to the workers."

War Drums?—Another authority feels GE's stand spotlights a trend that is already underway among more progressive companies.

"I believe managements are going to take a stronger position in bargaining in that they will attempt to work out a package before demands are made and sell workers on this package before negotiations start," says W. B. Billock, director of employee relations, Gulf Oil Co.

For one labor man the issues can be stated simply.

". . . I want to say that if GE—and others like it have their way—it'll be war," says Nicholas Zonarich, organizational director, industrial union department, AFL-CIO. He sees this aim for the company: "GE has opened its struck plants in an obvious declaration of union busting."

Not Flag Carrying — GE discourages any hasty generalizing. "We're not trying to bust any union," says a company spokesman. "We're not carrying the flag for all industry. We're just out for a settlement that's fair for everyone, including our employees."

Most labor relations men feel it would be foolish for any company to attempt to apply GE's formula at once to all situations. The electrical company had many special factors going for it in the present conflict: Mr. Carey's temperament; the split of labor into small groups;

Views on GE's Labor Tactics

Nicholas Unkovic, partner, Reed, Smith, Shaw and McClay.

"It will encourage companies with declining profits to take a stronger stand against demands they consider excessive."

"Many companies don't have the communications background of General Electric. They may not be as successful as GE; that doesn't mean they won't try."

Nicholas Zonarich, organizational director, Industrial Union Dept., AFL-CIO.

". . . right now I want to say that if GE—and others like it have their way—it'll be war. They are asking for it and I believe they'll get it unless they come to their senses."

"GE has opened its struck plants in an obvious declaration of union busting."

General Electric Co. spokesman:

"We're not trying to bust any union. We're not carrying the flag for all industry. We're just out for a settlement that's fair to everyone, including our employees."

Steel company spokesman:

"Should GE's approach be adopted? By all means. Will it? I don't know. We saw what GE was accomplishing 10 years ago and 3 years ago."

On the steel strike—"Our problem was in convincing the union we meant what we said after 18 years of saying one thing and then backing down."

the economic recession. These worked against an effective strike.

Want to Know—More important, GE's current stand has behind it a broad program that stretches back 14 years. Labor relations men agree that communications is a big part.

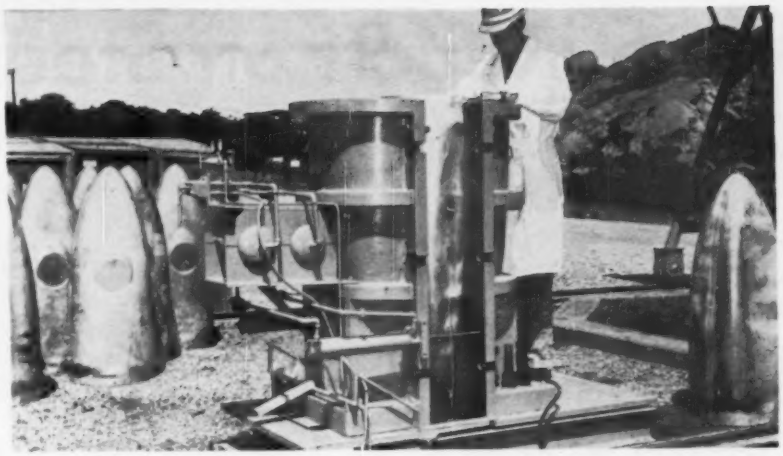
Gulf's Mr. Billock feels good communications can bring a change in the old alignment of worker and union against the company. "Employees want to be informed," he says. "They want to be identified with the company. The reason they haven't been is that we in management haven't given them the chance. I think there's something wrong when a man goes to his union steward for information about the company's vacation policy."

Not Inflexible—General Electric feels the success of its communications is due in part to the fact that it has established that it means what it says. This reputation has been achieved, says the company, by speaking openly on all subjects, however unpleasant.

In line with this policy is the General Electric bargaining approach. GE denies that it is inflexible; it says it has added a wage re-opener provision and vacation options to the first package this time. The company contends it listens to reasonable arguments for change but that it starts with a fair offer and won't change just for the sake of horsetrading.

Bargaining Politics—One of the arguments against this approach is that a union wants to "win" benefits for its members, not just be given them. This gets into a question that some say is very fundamental. The point is made that companies have gotten into a negative position on employee benefits. The union initiates demands; the company just attempts to hold down the package.

In its approach, GE goes into the question not only of its own costs but also employee needs, wants, preferences, attitudes, etc. It then seeks to devise a package that will have a reasonable cost and still have "sales appeal."



BANGED OUT: Aluminum pylons to attach Hound Dog air-to-ground missiles to under wings of B-52 bombers are formed by explosives.

Explosives Cut Costs

▪ Production parts of common metals for use in missile and rocket development are now being explosively formed in high quantities by Rocketdyne, a division of North American Aviation, Inc.

The company says the new method allows forming of common metals at costs competitive with other methods.

Few Rejects—To point out the competitive cost savings offered by the new process Dr. L. C. Stuckenbruck, supervisor of Rocketdyne explosive forming activities, says: "We have used explosive forming to square the ends of more than 2000 tubes to close tolerances with negligible rejections at a savings of about $10,000 over other processes.

"In many instances," he says, "explosive forming is the only method by which newer, more difficult parts can be formed."

Dr. Stuckenbruck says much of the saving possible is in the cost of dies. Metals formed by explosion need only one female die.

Speed is another important factor he points to. "We were able to form a small thrust chamber for a rocket engine only 36 hours after it was decided to begin fabrication of a die."

OLD FAITHFUL: Geyser of water rises from a forming pit after an explosive charge is set off. The part is formed in a die in the pit.

U. S. Report on Steel Labor—

It Says Government Should Keep Hands Off

Two important government studies will be released after the Presidential election.

One says government should stay out of steel strike negotiations. The other calls a 5 pct growth rate unnatural and taxing.—By R. W. Crosby.

▪ The Secretary of Labor's study on industrial relations in the steel industry will recommend that the government should stay out of steel strike negotiations.

This is one of two important disclosures of government studies which are still under wraps. Both are loaded politically, but will not be released until after the Presidential election.

In the other, it is learned that the President's Commission on National Goals will report that economic growth, measured by an arbitrary figure such as 5 pct, is not necessarily a national goal.

KENNEDY: The wrong goal?

Such a rate of growth, advisers have told the commission, will mean forcing segments of the economy out of proportion. For example, such an unnatural rate might necessitate billions of dollars in additional taxes.

The Conclusion—The report is likely to conclude that a natural 3 pct to 3.4 pct growth rate, with maintenance of such things as full employment, is more desirable for the country.

A conclusion that the government should stay out of labor-management strike talks could lead to the downgrading of the power of the labor secretary's office as far as strikes in basic industries are concerned.

But experts making Sec. of Labor James P. Mitchell's study found that the public's reaction to steel strikes has not been serious enough to warrant intervention of the type involving Mr. Mitchell and Vice President Richard M. Nixon in the recent strike.

Loud Implications—Both studies have loud political implications. The Sec. Mitchell study grew out of the 1959 steel strike when he and Vice President Nixon made political hay from their unusual intervention. This intervention did not sit well with some and Mr. Mitchell would like nothing better than to be vindicated by his study.

For this reason, he will not like the conclusion of the study. And, undoubtedly, he will say so, offering other conclusions to support his stand.

The Commission on National Goals, composed of leaders from industry, labor, education and the humanities, probably won't back the economic growth conclusion either. The final report to the President at the end of the month may not include this. However, when the supporting chapters are published in book form two weeks later, it most likely will be included.

A Kennedy Blow—Though the report will delve into various facets of America's future, the section on economic growth appears to be the most explosive, politically.

In the Presidential campaign, Sen. John F. Kennedy urges a growth rate of 5 pct. The conclusion that this is the wrong approach could be a headache for him. Such a conclusion, on the other hand, would support Vice President Nixon's views.

The Vice President contends that an arbitrary figure of rate of growth is not necessarily the way to measure national progress.

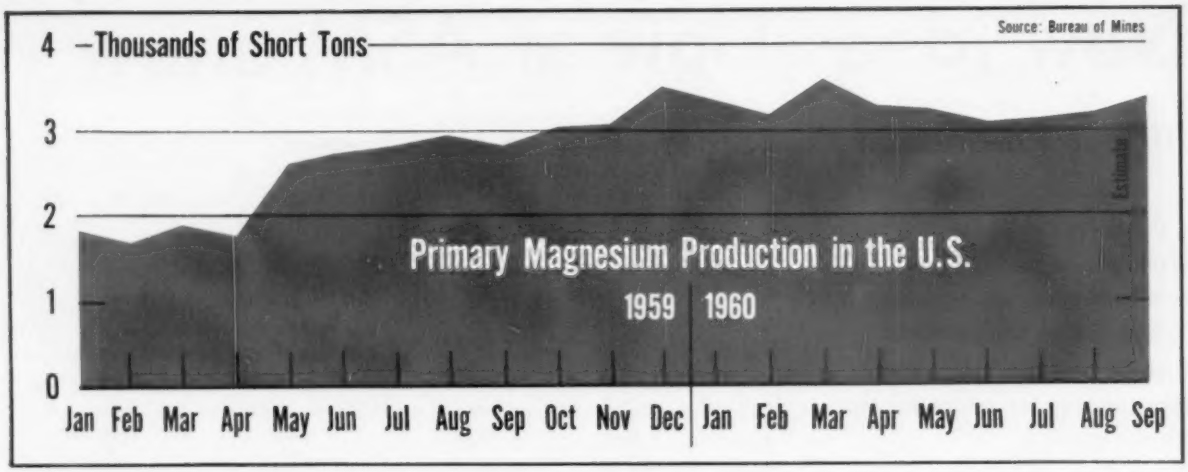
There was an attempt at non-

MITCHELL: Stay out?

partisanship by both reporting staffs. Sen. Kennedy, himself, has spoken of setting up similar commissions should he be elected.

Additional conclusions and recommendations of importance to industry and the nation will come from these studies. Mr. Mitchell's study, for example, may try to determine if industry is getting its proper return for incentives granted to labor.

The Commission on National Goals will try to point directions for the United States to go in the next decade. Among other subjects to be covered by the report are: Technological changes; the role of the U. S. in the world; science; and foreign economic policy.



Magnesium Goes After Volume

The magnesium industry believes it's on the verge of cracking the big volume markets.

Rolling, extruding and diecasting techniques have been adapted to aluminum equipment, lowering piece costs.
—By T. M. Rohan.

▪ Magnesium producers and fabricators feel they are on the verge of a big breakthrough into the auto industry and other big volume users. With a lower price for wrought products and a new source of supply established this year, the field is open for capitalizing on magnesium's special features.

In Cleveland last week about 350 industry leaders gathered for the 16th annual convention of the Magnesium Assn. to exchange views. The group elected Chas. A. Howe, president of Hills-McCanna Co., Chicago, as its new president.

Steady, Then Up—"Shipments of magnesium for this year will barely equal 1959 or about 47,000 net tons," says Dr. E. Howard Perkins, board chairman of Brooks & Perkins, Inc., Detroit, largest fabricator of wrought magnesium products. "But next year we feel that the industry will hit 55,000 or 60,000 tons," he said.

"We are at last becoming competitively priced with diecast and wrought products. This is through new alloys which have been developed and sell for under 30¢ per lb."

A good example of how magnesium's easy drawing qualities pay off is in teletypewriter machine covers made by the thousands by Brooks & Perkins. These can be drawn in a single stroke of a press. Aluminum would require a three-stage draw.

More for Your Money — While much of industry is talking compacting and miniaturization, magnesium people are talking bigger volume per weight unit and dollar. "Because of the higher volume you get with magnesium than aluminum (15-20 pct) you can pick up more structural strength through design," says J. D. Hanawalt, vice president of Dow Metal Products of Midland, Mich. "So we are finding many new applications for magnesium as a structural material, a good part of it in transportation equipment where it increases payload.

"We are also now in better competitive position on a piece-for-piece basis because rolling, extruding and diecasting techniques have been adapted to existing aluminum equipment, thus boosting utilization and cutting capital costs."

The Mother Lode?—The automotive industry is, of course, one of the biggest targets for magnesium marketers. So far it has been mostly a disappointment with only about 1 to 5 lbs. used per car. But with more accent on speed of manufacture in the U. S., plus new alternate supply sources and piece-by-piece competitive pricing, industry men are optimistic.

Primary magnesium shipments in the U. S. have been largely in a decline since Korean war days when they hit 104,000 net tons. Much of this was in powder form as a reducing agent for titanium which has since declined. Russia produced about 45,000 tons of metallic magnesium last year compared to 31,000 for the U. S. Norway was a distant third at 10,250 tons.

Up in the Air—In technical sessions, magnesium's part in space explorations was described by several speakers. Its major virtues: Light weight, low cost and easy fabrication.

Louis R. McCreight, manager of materials studies for General Electric Space Sciences laboratories in Philadelphia, said that many missile nose cones now are made of cast magnesium and aluminum.

New Ideas Flow at ASM Show

Higher Productivity is Target of Most New Lines

Exhibitors at ASM's 42nd Metal Exposition featured equipment and materials to keep U. S. metalworking competitive.

Metalworkers aim at larger share of growing space and electronics market.

■ Exhibitors at the American Society for Metals 42nd National Metal Congress and Exposition in Philadelphia, October 17-21, took dead aim at increased productivity.

Placing the "urgent" stamp on this target is the increased tempo of competition—intra-industry, alternate materials, and foreign. Lending weight to the urgency is the rising cost of labor and materials.

Some of the 237 exhibiting companies, while offering equipment and materials for higher productivity to their traditional customers, showed their progress in hitting the space and electronics market. At least one new company in this field was revealed. General Astrometals Corp. has been formed to produce metals, ceramics, and cermets for high temperature and nuclear applications.

STEEL QUADRILON: "Build it Better with America's Steel" was theme on revolving sphere of 34-ft all-steel tower at the ASM Metal Show. Sixteen steel companies exhibited in circle around tower.

Aluminum Co. of America featured a display of a space satellite and the aluminum alloys used in it. Lindberg Engineering Co. exhibited equipment designed to purify germanium elements used in electronics.

Ultrasonics Interests—Ultrasonics equipment drew more than its share of attention from the some 25,000 visitors to the show. High interest was shown in the promise of faster and better metal cleaning and testing with ultrasonics.

Westinghouse Corp. featured a five-gallon tank capacity ultrasonic cleaner that can be placed on a table-top. It sells for less than $1000. The company claims ultrasonics is proving to be 2 to 10 times faster than other methods in cleaning many hard materials.

Sperry Products Co. showed a high-speed scanner for ultrasonic flaw detection. Using a transducer wheel, material can be passed under it at high speed. This equipment is just coming into the market after testing 3.4 million miles of railway tracks.

Electronics Market—Striking at the exacting requirements of the electronics field, Instron Engineering Corp. featured a wire-testing machine that has successfully measured the straightness of wire as fine as 0.5 mil in diameter. It is used for testing straightness of bare and plated wire for use in electronic tubes.

Another piece of equipment designed largely for electronic metalworking came from Philco Corp. The company's Lansdale Div. displayed modular-controlled atmosphere systems designed and built by the division's recently formed equipment development and manufacturing operation.

The equipment features vacuum machinery and dry boxes for indus-

trial processing where precise control of dust and atmospheric conditions are necessary.

William J. Peltz, vice president and general manager of the Lansdale Div., says the equipment was originally designed for Philco's automated semiconductor manufacturing line. This, he claims, means the system has had the advantage of "on-the-job experience."

Construction—Construction metalworkers found interest in a bending-separator gage introduced by the Budd Co. This gage will separate and identify tensile strains and strains produced by bending moments on the surface of a structure. Major feature of this new device, called Flexagage, is that it can be mounted on one side of a structure only. This eliminates the need for mounting strain gages back-to-back both inside and outside of such structures as pressure vessels and aircraft wings.

In the Steel Arena area of the show, dominated by a 34-ft high steel quadrilon, 16 steel companies laid out their wares. Drawing good interest were the "colored" steels of Washington Steel Corp. and Enamelstrip Corp., a National Steel Co., subsidiary.

Color in Steel — Washington Steel's ColorRold line uses a baked acrylic coating applied to stainless steel. Available in coils or sheet in a wide range of gauges in 10 colors, it can be formed, drawn, and bent to extreme degrees without damage to the color coating, according to the company. Price is kept competitive, says the company, as steel two gauges lighter can be used compared to similar applications with uncoated steel.

Available in coils, National Steel's Enamelstrip points to the advantage of shorter production schedules as shearing, slitting, and hand feeding are eliminated.

Any surface design or texture can be duplicated through use of a photographic process in preparing the steel's coating. The company's vinyl laminate on cold rolled steel yields a colored steel casting for about $.32 a square foot.

Imported Brainpower

Report on Europe

This is the third of a series of on-the-spot reports by G. F. Sullivan, editor of The IRON AGE, who recently completed his sixth peacetime visit to Europe.

■ If you walk into a spanking new office building at 32 Beethoven Strasse in downtown Zurich and take the lift to the fifth floor, you will come on a phenomenon which is rather new in industrial affairs.

This is the office of Dr. Robert F. Mehl, on leave as professor of metallurgical engineering at Carnegie Institute of Technology, Pittsburgh. He has set up headquarters in the Swiss city to act as a consultant for U. S. Steel Corp. His job: To keep in touch with all the major research centers in Europe, discussing and exchanging information on basic research.

While U. S. Steel is alone among American steel companies with this setup, more than half a dozen other major U. S. companies are actively interested in research on the Continent. General Electric Co. has two scientists in Zurich doing substantially the same thing as Dr. Mehl. IBM, RCA and Monsanto have labs in Zurich; Tennessee Eastman is moving in. Du Pont is setting one up in Geneva.

Battelle Memorial Institute supplements its Columbus, Ohio, operation with laboratories at both Geneva and Frankfurt. Union Carbide is the primary sponsor of European Research Associates, an independent organization housed in fine new laboratories in a suburb of Brussels.

Long-Range View — Most of these facilities are primarily for basic research, which has been defined as research where you don't hope for any profit in less than five years, if that. U. S. companies contributed to other projects in Europe too. But the ventures mentioned above are a new dimension in harnessing brainpower on an international scale.

Dr. C. E. Sunderlin, formerly with the National Science Foundation, and now assistant director of European Research Associates in Brussels, explains this new "international research concept" quite simply: "There are a great many fine scientists here in Europe.

"In selecting a site for this new laboratory a few years ago our aim was to provide an atmosphere where these people could gather and work in their chosen fields. You might" he says, "persuade such people to move to America—but their home life, and even their working conditions, would not be the same. Naturally, this would affect their work."

Dr. Mehl points out that scientists have a great deal of prestige in Europe, that the title "professor" carries considerably more weight in Europe than it does in the United States. There is a more satisfying life there for the scientist who would like to spend his life in basic research, with no particular urge to get into management.

Any American observing European business quickly discovers that it is more class-conscious than companies he's familiar with. Rarely does the son of a poor family move up to top management. But such a man can become a scientist. He has no urge for a management job; his is a different dream.

It's Designed for Liquid Oxygen Storage

A 13-TON SPHERE: Installation of a huge aluminum sphere nears completion at Colorado Fuel & Iron Corp.'s new on-site oxygen plant at Pueblo, Col. The 13-ton sphere will store 25 million cu ft of liquid oxygen at the super-cold temperature of –300°F.

Metal Stockpile Now Totals $8.5 Billion

Strategic and critical materials in six Federal stockpile inventories totaled $8.5 billion at the end of August. This includes $6.2 billion in the national stockpile where itemized detail is classified.

Net change in stockpile inventories during the month reflects acquisitions, disposals and adjustments.

Combined figures from five nonclassified inventories show these materials (in all grades and forms) leading in cost value: Aluminum, bauxite, etc., with 6.7 million short tons at a cost of $474 million; tungsten, with 84 million pounds at a cost of $341 million; and manganese and ores, with 4.7 million short dry tons at a cost of $311 million.

Transactions Listed—Other relative items include: Cobalt, with 25.9 million pounds at a cost of $53.7 million; copper, with 170,000 short tons at a cost of $75.3 million; nickel, with 133.1 million pounds at a cost of $117.4 million; and titanium, with 28,000 short tons at a cost of $190.6 million.

Stockpile transactions during August included aluminum, cobalt, copper, manganese, nickel and titanium. The transactions were:

Aluminum: An acquisition of 2000 short tons with a cost value of $1.1 million.

Cobalt: An acquisition of 108,000 pounds with a cost value of $286,000.

Copper: The disposal of 1000 short tons for $310,000, and the acquisition of just less than 500 short tons for $229,000.

Manganese (metallurgical grade): The acquisition of 24,000 short dry tons with a cost value of $901,000; and the disposal of 4000 short dry tons for $41,000.

Titanium: A total of $4000 worth was lost through adjustment, while 1000 short tons were acquired for a cost of $2.1 million.

Nickel: An acquisition of 6.8 million pounds with a cost value of $4.9 million, and the disposal of 4.1 million lb for $3.5 million.

How Automation Affects Employment

Management, labor, and the government, despite continued disagreement, are taking a new look at industry automation.

The Congressional Joint Economic Committee reports that leaders of the three factions are finding more and more areas of agreement in automation. They agree that the use of automation is growing, that it increases the demand for engineers and technicians, and that a stable economy can smooth over many of the short-run problems automation creates.

No agreement has been reached on the big question, however:

Is automation causing the nation's rising unemployment?

New views of this problem, the committee reports, are:

1. Automation causes few direct layoffs. But after a business slump, factories take back fewer workers than they laid off.

2. Automation has not upgraded jobs, as popularly believed. Some skilled workers, for instance, have been forced into unskilled jobs.

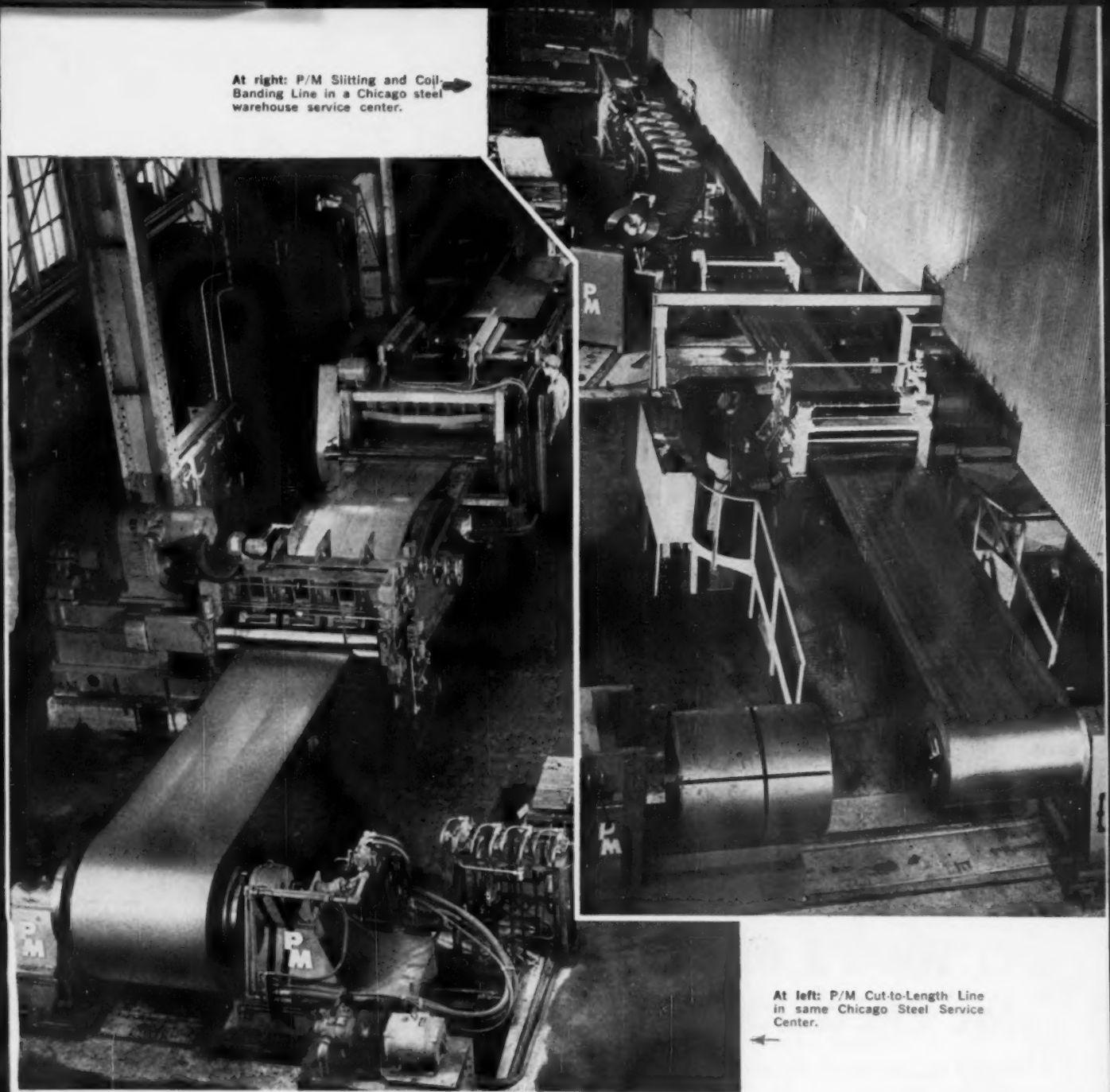
3. The expansion in service employment may take up some of the slack.

Beryllium Markets Still Expanding

Beryllium markets continue to expand at a high rate in the space and electronics fields. Brush Beryllium Corp. is building a new manufacturing plant in Cleveland. This will increase the company's fabricating capacity by 50 pct.

The new plant will cost $3 million and allow for future expansion.

Earlier this year, Brush Beryllium opened a $400,000 plant near Oakland, Calif. and announced plans for a $6 million plant to double production at Elmore, O.



At right: P/M Slitting and Coil-Banding Line in a Chicago steel warehouse service center.

At left: P/M Cut-to-Length Line in same Chicago Steel Service Center.

P/M Lines help make this Steel Warehouse a Service Center

Chicago area warehouse customers get faster service, a better product, as a result of new features built into P/M Cut-to-Length and Slitting and Banding Lines shown here. These lines incorporate special features which, developed through P/M's *productioneering* approach, fit the specific needs of steel service center operation, and increase the speed, accuracy, and economy with which these lines operate. *Productioneering*—designing and building a processing line to the particular needs of the user—makes P/M lines for warehouses simple to operate, easy to maintain, flexible to handle all warehouse requirements. We will be glad to furnish details about the advantages you can get from "productioneered" lines—just write to:

Production Machinery Corporation
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Designers and Builders of Metal Processing Lines and Equipment including: lines for pickling, slitting, shearing and cutting-to-length, grinding, scouring, coil build-up, inspection, and other sheet and strip processing lines and machinery.

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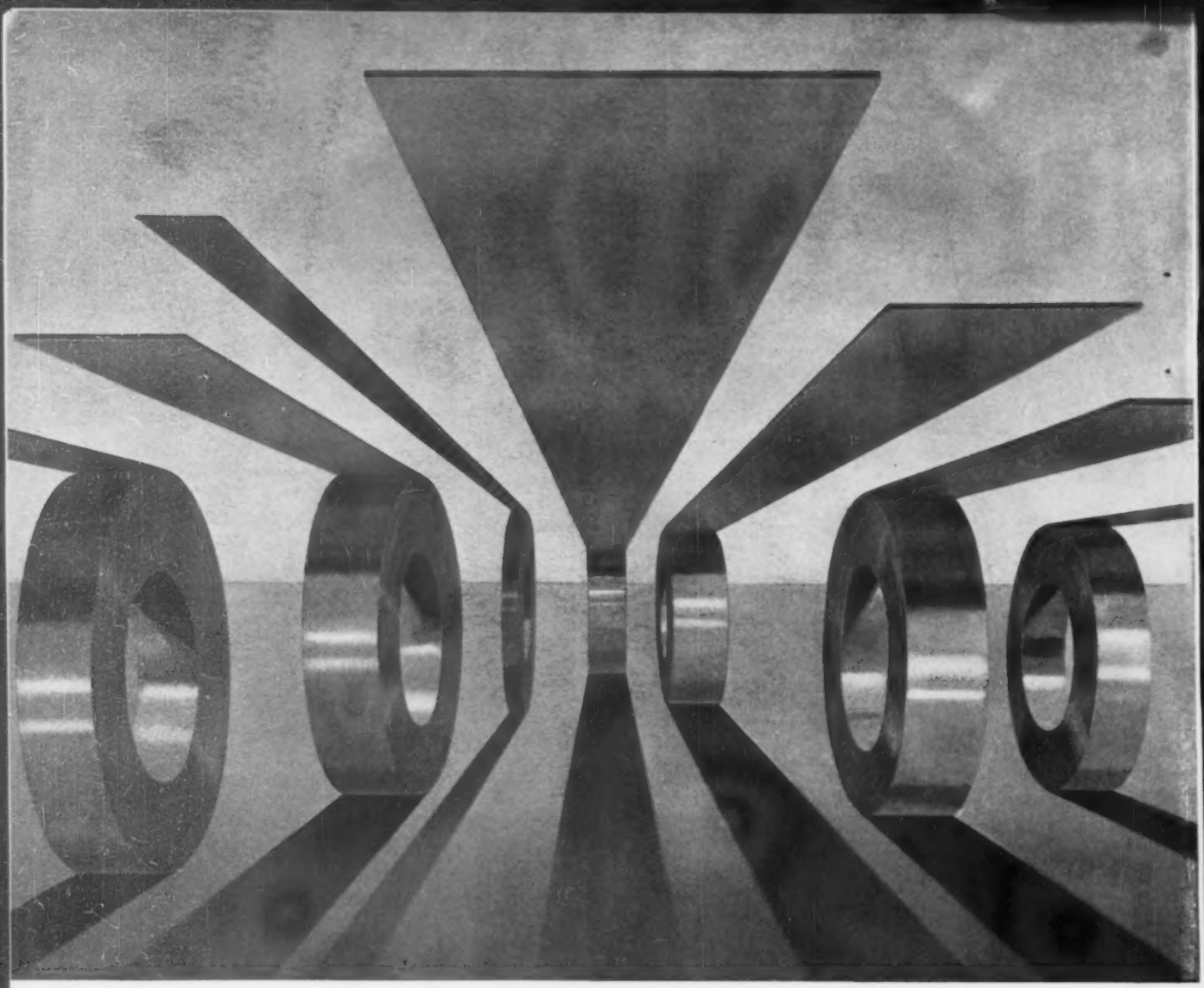

WHAT'S DIFFERENT ABOUT J&L PRECISION STRIP STEEL?

The big difference in J&L strip steel is controlled uniformity.

When J&L Precision strip is ordered to exacting specifications, you can be sure that your specifications will be met . . . inch after inch, coil after coil, time after time.

The dimensional accuracy of J&L strip steel, consistently maintained, offers many cost-saving advantages. This means fewer rejects; fewer production problems; less down-time for tool adjustment. This means that you are getting the steel you pay for . . . in terms of maximum product yield per ton.

How?

By delivering the steel you order . . . to your specifications . . . J&L helps you to achieve optimum production with control of in-plant fabricating costs.

The experience, facilities, and accumulated know-how of a specialized organization . . . directed exclusively to the processing of low carbon, high carbon, alloy, tempered and stainless strip steels . . . are available to work for you. For assistance in solving your problems, call your J&L Stainless and Strip Division representative; or write to Dept. 233-Y—1010.

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TEMPERED SPRING STEEL • ZINC AND COPPER COATED

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Youngstown 1, Ohio

Bring Marketing Up-to-Date

There's no longer any leeway for mistakes in industrial product marketing.

But today's tougher competition has benefits. By pointing out selling weakness, it can provide long-range marketing strength.

■ If you make and sell industrial equipment, 1960 has probably brought you plenty of marketing problems.

In any event, selling has often been tougher than for makers of consumer goods. As a result, your marketing program has been getting a rugged test.

Borrowed Ideas—But stress put on industrial marketing this year can have long-range benefits. It may spotlight weak points that need shoring up. And it's possible industrial marketers can even pick up some ideas from consumer marketers.

A plan for sound industrial selling is spelled out in a report by the Assn. of Consulting Management Engineers in the latest issue of the group's "Acme Reporter."

Until recently, the report says, industrial marketers relied too much on some doubtful market factors. They believed selling was based on: Close contacts with customers, definite product differences, rational buying motives, low promotion costs, wide dollar margins, and orderly channels of distribution.

Know the Buyer—Actually, the report points out, industrial marketers probably never were on very sound ground in these beliefs. And now, many producers are in the same boat as consumer goods makers.

Research shows the industrial marketer has not always known or understood his customers—even in terms of direct, person-to-person relationships. And now he must think in terms of more consumer research. He must make more deliberate efforts to understand his customers if he's going to do a real selling job.

Says the study: "There's no longer as much leeway in making mistakes. The cushion is gone. Now marketing inefficiency shows up for what it is—and it has a very damaging effect on profits . . . But this increases the opportunity for one company to pull ahead by doing a better marketing job than others."

Don't Move Blindly—This being the case, what can you do about your industrial marketing program? Careful planning is called for. Short-term action, expanding the product line blindly, or panicky cost-cutting are not the answer.

What's needed, basically, are shifts in the thinking of marketing and general management executives. Emphasis must swing from production-thinking to marketing-thinking.

The whole idea is this: Stop taking market conditions for granted and plan how to change them.

. . . But Plan Moves Carefully

■ But any plan, the study notes, must be serious, detailed, and long-range. And three kinds of management action are necessary to make it effective. There must be product or market direction, general marketing management, and overall coordination of marketing efforts and the balance of the company.

Tough Decisions — Action that cuts across the functional lines of marketing, finance, manufacturing, and research may be necessary. Crucial decisions must be made.

Finance, for example, may have to consider capitalizing heavy initial promotional expenses. Manufacturing may have to build inventories faster than generally believed economical. And research may need to provide more models and specifications to back up the sales story.

Belief and Backing — Marketing management's role is seeing that the planning gets done. Top management, in turn, must believe in strong marketing management. And the front office must make sure the rest of the company understands the new approach.

Many questions must be asked —and answered. Some include:

What objective should you shoot for which will stretch your effort, but be within your capabilities—in terms of sales, share of the market, and return on investment?

What level of activity is most profitable? At what point can you exert the most leverage on the market in our favor?

How shall your efforts be timed? Should they be heavy at first to get into the market, then leveling off for maintenance? Or should there be a slow, steady build up?

and now...

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First fully Power-Controlled H.B.M.

The Dynamill* H.B.M. uses Bullard's new Dynamic Precision Control System to increase productivity of the machine and quality of the work.

Dynamill* now brings the work and tool together in the shortest possible time.

These features on the new Bullard Dynamill* H.B.M. provide optimum productivity:

- **Simple push button pendant control**
- **Easy-to-read clock type positioning dials**
- **Four traverse rates including creep**
- **Infinitely variable feed rates which can be changed while the tool is in the cut.**

Simple push button pendant controls and clock-type positioning dials accurately locate head, table, saddle, and spindle.

Available in 3, 4 and 5 inch spindle sizes, four standard head post heights, five table sizes and five bed lengths.

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POWER CONTROLLED Simple pendant controls start, stop and speed of spindle as well as all directional movements of head, table, saddle and spindle. Large, easy to read clock-type dials show exact position of work in relation to tool. Infinitely variable feed rates and four traverse speed rates. Power Draw Bar for fast and easy tool change. Fully automatic hydraulic binders for head, table and saddle.

VERSATILE Saddle stops allow rapid traversing of saddle to pre-determined positions. Depth-Au-Trol* provides accurate spindle depth Control. Modified Mark 1 Tape Control for head and table positioning. Continuous feed facing attachments with infinitely variable feeds. Right-angle milling, thread cutting and contouring attachments. Built-in or auxiliary tables.

COMPACT AND RUGGED The new Bullard Dynamill* H.B.M. is compact in design — lower in overall height — requiring less floor space, yet has more built-in rigidity and durability.

EASY MAINTENANCE Automatic lubrication throughout — fewer parts — fewer adjustments — easily accessible.

"YOU CAN'T BEAT A BULLARD"

Malleable Climbs in Auto Use

The Old Material is Still in Demand by Automakers

While there is a great emphasis on new materials by automakers, producers of malleable iron say its use is increasing.

In fact, the average 1961 car contains 100 lb of malleable iron castings.—By A. E. Fleming.

▪ More than a million people walked through Detroit's Cobo Hall last week viewing the National Automobile Show. They learned about a metal remote from the average car owner—malleable iron.

An exhibit by suppliers of malleable iron components showed how modern auto engineers use its products.

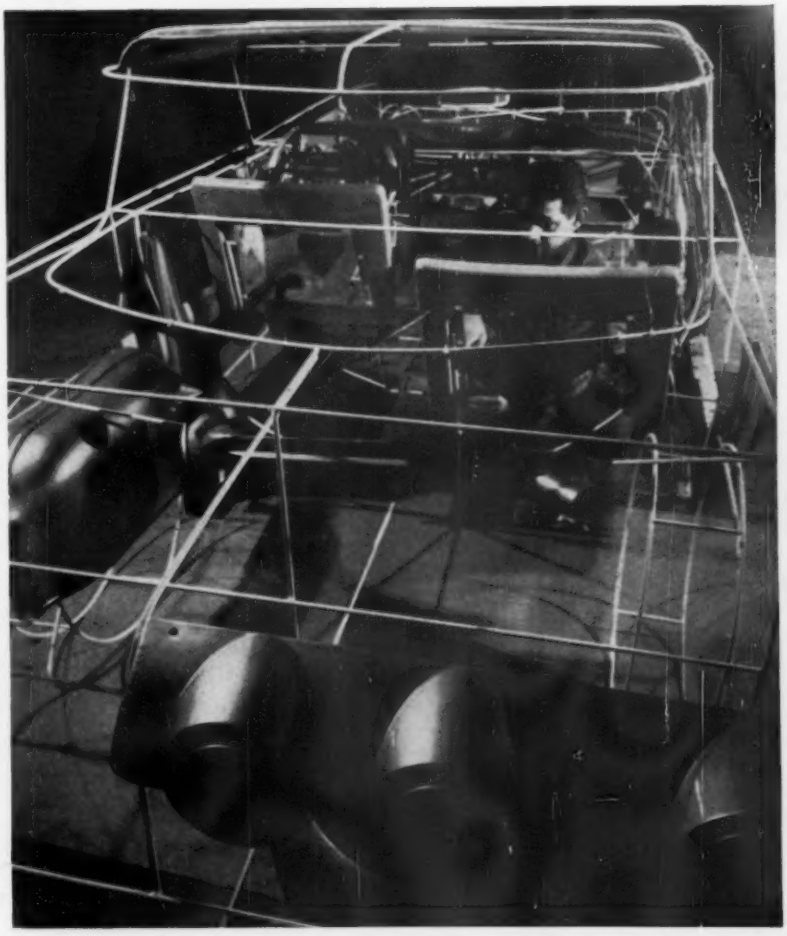
Malleable castings go mainly into a car's internal construction. Strong and easy to machine, they are used for such parts as torsion bar anchors, spring brackets, clip pads and guide brackets in suspension systems; ring gears, planet carriers, shifter forks and turbine hubs in transmissions; brake drums, pedals, brake spiders and brackets in brakes; gear housings, brackets, valve bodies and knuckles in steering systems; carriers, gear cases, joint yokes and bearing caps in differentials; and crankshafts, rocker arms, fan pulleys and sprockets in engines.

Rising Consumption — The amount of malleable iron castings consumed by car producers has risen in recent years. In 1959 automobiles about 490,000 tons were used; in 1960 models about 530,000 tons. There are about 75 different parts and components made of malleable iron in domestic cars. The average 1961 car will contain 100 lb of malleable iron castings.

Also, the trend toward compact cars has helped malleable makers. While steel and grey iron needs for compacts range from one-fourth to one-third less than for standard size cars, malleable has gone up. Pearlitic malleable iron is used for crankshafts in the new Buick Special, Oldsmobile F-85 and Pontiac Tempest.

General Motors Corp. says malleable was chosen as the material for the critical power system part because of lower initial cost, less machining requirements and good

Plastic Car Enters Auto Wonderland



ON DISPLAY: This "plastic car" is the Society of the Plastics Industry, Inc., entry in the "Auto Wonderland" display and keynotes its exhibit of most of the more than 300 components made of plastic materials that appear in 1961 passenger and commercial vehicles. Frame is welded wire.

design characteristics. Malleable crankshafts weigh about 68 lb each and send the amount of malleable in each of the B-O-P small cars to over 100 lb.

A Hump Reducer—The Special also uses malleable castings to help reduce the size of the hump in its driveshaft tunnel. The shaft is split in the center of its length with a constant velocity Cardan universal joint. The joint has malleable iron castings.

An axle design on the Special and on the Ford Falcon, Mercury Comet, Plymouth Valiant and Dodge Lancer relies a good deal on malleable iron. In axle use, steel tubes are forced under pressure into the sides of malleable iron differential carriers to form an integrated axle assembly. The malleable expands to accept the tubes, then grips them making the joint oil tight.

Important to Technology—The development of pearlitic malleable iron has been important to malleable iron technology. Since 1945, first year of post-war auto production, tonnage sales of pearlitic malleable iron have risen 600 pct, an average of 40 pct a year. It is a harder, more wear resistant kind of malleable iron. With tensile strength ratings up to 125,000 lb per sq in., pearlitic malleable iron is the material used for the crankshafts in the B-O-P cars, as well as in cranks of regular Pontiacs and GMC trucks. Over one million of these crankshafts are now in service.

Another pearlitic malleable part is the torsion bar arm used on GM heavy trucks. Two of these arms, one on each wheel, carry the entire front end of the truck.

Will Use of Plastics Grow in Autos?

1961 model cars at the Auto Show contained an average of 22 lb of plastic materials. Plastic is used in more than 300 separate items not including upholstery, paints or finishes.

Plastics makers contend the 22 lb replace about 150 lb of steel and other metals. Seven years ago the average amount of plastics in a car was 11 lb. One-fifth of the increase since the 1954 model year has taken place in 1961 models.

Glowing Words—Like suppliers of other automotive materials, plastics producers speak glowingly of their product's potentials for the coming 10 years. W. T. Cruse, executive vice president of the Society of the Plastics Industry, Inc., estimates that 500,000,000 lb of plastics will be consumed by the auto industry by 1970.

He says this is based on a "conservative" projection of 60 lb a car by the end of the 1960's. Total U. S. production of all plastics is expected to reach around 6,500,000,000 lb this year.

However, rivals of plastic are not so sure of the material's future success in the automotive market. The American Zinc Institute Inc., for example, concerned over the future of chrome plated zinc die castings, is critical of plastic as a competitor.

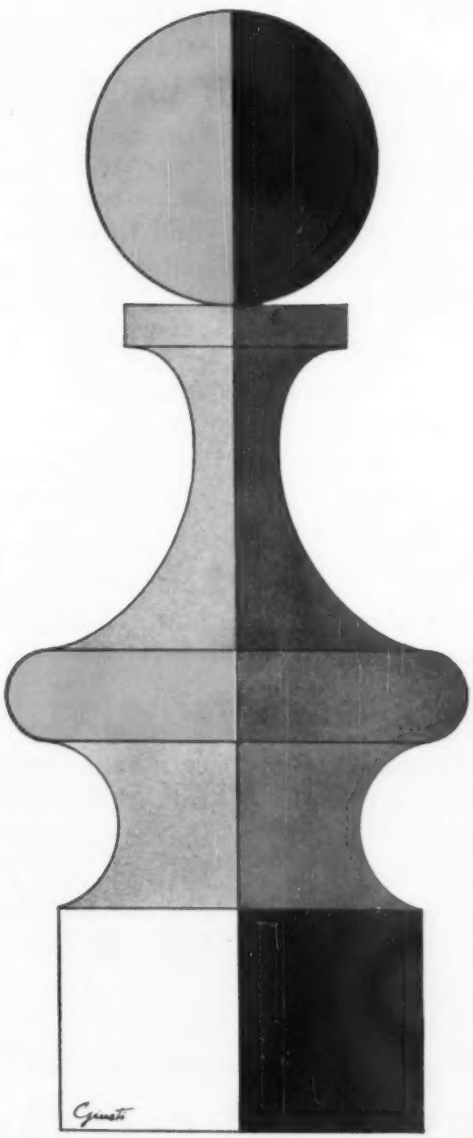
Especially Delrin — AZI singles out DuPont's Delrin for criticism. Delrin is used on some Chrysler Corp. compacts for instrument panels in place of die cast zinc. AZI says a comparison of Delrin with Zamak No. 3 zinc alloy, most commonly used in zinc die castings, shapes up like this: Impact Strength—Delrin 1.4 ft lb, Zinc 43 ft lb; Tensile Strength at room temperature as cast—Delrin 10,000 lb per sq in., zinc 41,000 lb per sq in.; Shear Strength—Delrin 9510 lb per sq in., zinc 31,000 lb per sq in.; Coefficient of Thermal Expansion—Delrin three times that of zinc; Melting Point—Delrin 347° F, zinc 728°F.

Chrysler is trying the plastic instrument panel cluster to find out how its cost compares to zinc and magnesium on a production run basis.

White Offers New Compact Truck

WHITE COMPACT: Built for delivery and pick-up service this new White Motor Co. truck has exclusive wide track front axle (80 in.) and extremely short wheelbase (114 in. to 150 in.). Cab is only 65 in. long. Standard engine is the 6-130 A Super Mustang with others also available.

You'll form it faster with Western Brass because...one machine pass can take you from brass strip or sheet to a completely formed pen cap, hose coupling, lighter case, lamp base or similar shape. And Western Brass offers a special advantage. Users will tell you that our skill in annealing and rolling actually gives them more strip per dollar...more good parts per pound. You'll make it better with ductile, formable brass. You'll make it best with "tailor-made" Western Brass.



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WHERE DO YOU STAND ON COMPUTER CONTROL— LEADING OR LAGGING?

Far-sighted leaders in industry are realizing the benefits made possible by applying computer control systems to their processes.

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The GE-312 Computer Control System embodies adaptability and flexibility to meet many types of applications in varying size plants. For example, compare its expansible memory—capacity up to 52,000 words. Compare its flexible input/output—capable of scanning up to 1500 instrument inputs. These are maximum capabilities, expansible from a minimum system. You buy a system tailored to your exact requirements.

Add to this versatile equipment the computer systems engineering ability demonstrated by General Electric in implementing these twenty GE-312 system applications.

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Steel Sales Slide in Farwest

Slowdown Baffles Area Used to Continuous Boom

Metalworkers in the Farwest are accustomed to constant growth and have come to expect it.

But since the first half of the year, steel sales have dropped substantially.—By R. R. Kay.

■ The upcoming presidential election is playing second fiddle to the bearish talk you hear among Farwestern businessmen.

They point to the region's low steel operating rate—a bit over 50 pct of capacity. And they're disappointed that the industrial tempo isn't faster.

The Farwest is an area that's used to a continuous boom. It regards constant growth as normal. So the current slowdown is bewildering.

Kaiser Comments—W. R. Riggs, Kaiser Steel's manager of Commercial Research, has this to say about the 1960 steel market: Steel sales averaged 20 pct higher during the first six months of this year than during the like 1959 period.

"Since mid-1960, purchases from the steel mills have dropped substantially. That's due largely to customers reducing their inventories," Mr. Riggs says.

Actual use of steel, however, is down only moderately. Construction, the area's big steel user, is pretty strong.

Annual Report—Kaiser has just released its annual steel market report. It covers the seven Farwestern states: California, Oregon, Washington, Utah, Arizona, Nevada, and Idaho.

Here's a rundown:

In 1959, steel sales hit 6,216,000 tons, despite the 116-day strike. The market for steel mill products was up 12 pct over 1958.

Farwestern steel users bought 763,000 tons of imports last year. That was a new high. And it's more than double the 1958 tonnage.

Imports Are Easing—During the first six months of this year 380,000 tons of foreign steel came into West Coast ports. Lately, however, the trend is downward.

Steel service centers are still the mills' big customer. They took 25 pct of last year's mill product output. That compares with the national average of 19 pct. The fabricating industry also rates high. It bought 22 pct of the total mill receipts.

Memo to marketers: California chews up 76 pct of the tonnage; Oregon and Washington, 15 pct. The other four states, take 9 pct.

Pattern of Farwest Steel Use: 1957-1959

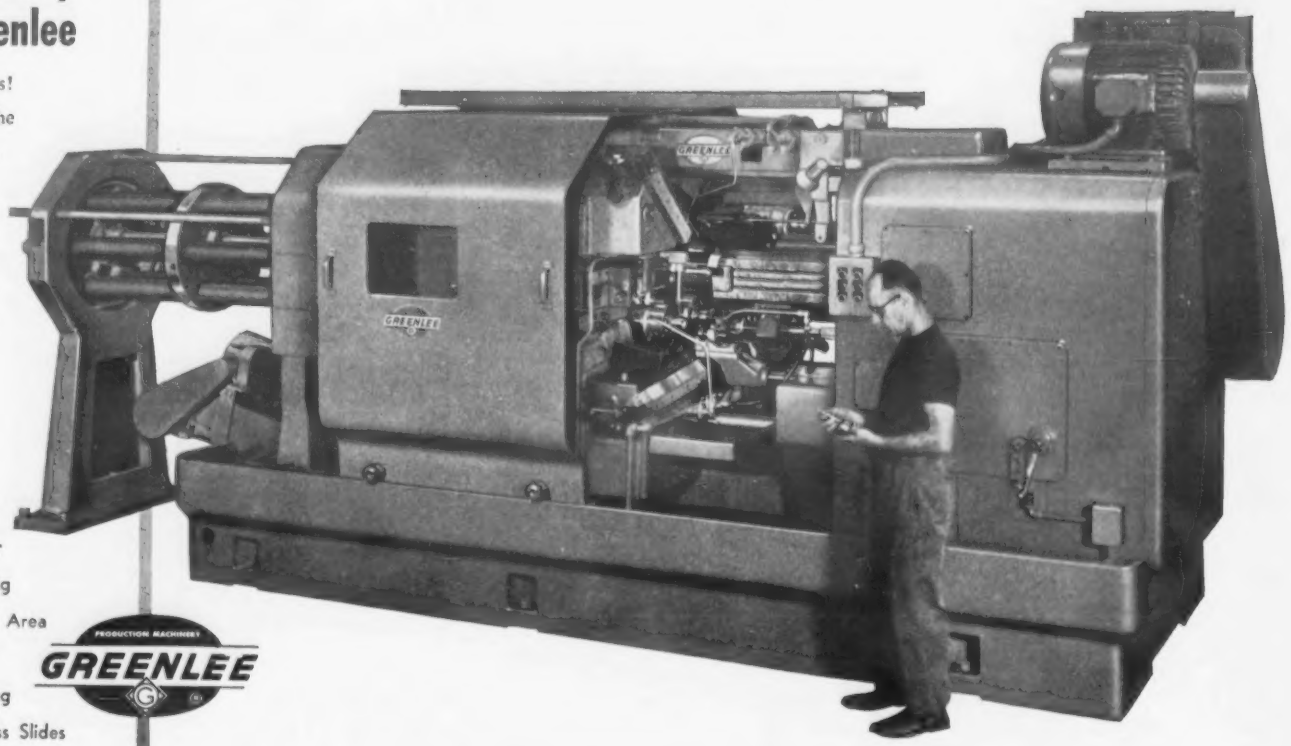
PRODUCTS	1959 Net Tons	1958 Net Tons	1957 Net Tons	Pct Change 1958-1959
Plates	936,000	925,000	1,333,000	+ 1
Sheet and Strip	1,257,000	1,065,000	1,144,000	+18
Struct. Shapes	460,000	400,000	702,000	+15
Hot-Rolled Bars and Bar Shapes	1,110,000	930,000	1,085,000	+19
Pipe and Linepipe	470,000	360,000	503,000	+31
Tin Mill Products	1,120,000	1,150,000	1,100,000	− 3
Other Products	1,025,000	810,000	1,053,000	+27
Total	6,378,000	5,640,000	6,920,000	+12

Source: Kaiser Steel Corp.

Now . . . 3½" Capacity With This New Greenlee

Biggest of the Greenlee Bar Automatics! This new 3½"— 6 spindle model offers the most outstanding advantages in the field. It is exceptionally versatile. It offers well-known Greenlee dependability. Like all Greenlee Automatics it has independent, cam-operated cross slides and a wide-open tooling area. Greater flexibility, accuracy and productivity are built into this big, powerful Greenlee Automatic. Check these outstanding advantages:

- Permanently Aligned Spindle Carrier
- Positive, High-Speed Carrier Indexing
- Wide-Open, Easily Reached Tooling Area
- Sturdy, Cam-Feed Main Tool Slide
- Interchangeable Cross Slide Camming
- Micrometer Adjustment On All Cross Slides
- Rapid-Shift, Dual-Range Speed and Feed Gears
- Built-in Lead Screw Threading Feed and Drive



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Satellite Station Saves Space

Machine Has Both Automatic and Manual Operations

An unusual rotary machine has a final machining station off the dial.

This arrangement allowed a smaller machine with fewer fixtures.—By R. H. Eshelman.

▪ Thinking a production problem through can mean a double gain. That's the case with a recent development of an unusual rotary machine that incorporates a final machining station off the dial.

The unusual arrangement meant a smaller machine with fewer fixtures. This set-up gives the operator more time to load and unload fixtures. Original cost of the machine is less, too. Production rate is about 262 parts per hour based on 80 pct operational time.

Process Steps—It was designed by Cross Co., Detroit, with flexibility a prime consideration. The machine takes two different sizes of rear axle carrier bearing caps.

Process steps are: Milling the flats, drilling holes to half depth, and drilling full depth. The operator turns caps over and loads them in the fixture of the off-dial station. There the holes are spotfaced.

Cost and process analysis revealed this combination of automatic and manual operation would be simplest and most economical.

Tooling Features—Tooling is interesting. The milling cutter is carried on a standard, horizontal, hydraulic-feed unit. All other tools, including spotfacers in the off-dial station, are carried in a special head mounted on a standard, vertical, hydraulic-feed unit.

The operator loads two raw malleable iron castings in the dial fixture, actuates a hydraulic clamp and starts the two workpieces from the dial and sets them on a shelf near the off-dial station.

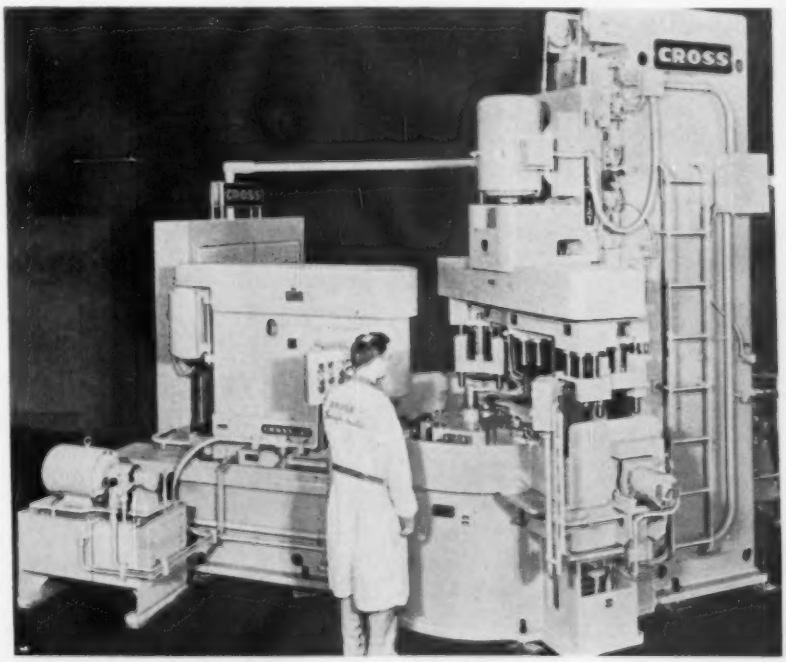
During dial index he loads these two workpieces from the shelf into the fixture in the off-dial station. A pushbutton hydraulically clamps the parts and starts this final operation. During index, the dial fixture in the load-unload station unclamps automatically for the operator.

Automated Unloading—As the vertical head retracts, it actuates a cycle for unclamping the finished parts in the off station, activating a 360° rotation of a pair of arms. They pick the caps out of the fixture and transfer them to a discharge chute; thus unloading is completely automated.

Normally the operator clamps pieceparts in the load position so he can see that they are properly seated. If he forgets, the fixture automatically clamps the parts before the milling begins. Without such safety clamping the milling cutters could throw unfastened parts out of the fixture with great force.

Changeover Time—The machine setup can be changed over from one size of bearing cap to the other in about an hour-and-a-half. The two parts differ in height, hole size and center distance. Spacers and height blocks in the fixtures are changed to take the new part. Outboard location is held constant so the clamp stroke remains the same.

Tool changing, either for a switch in parts or for regular tool maintenance, is simple. Tools are preset in adaptors away from the machine. Only drills and spot facers are replaced in the part changeover.



OUTER SPACE: Unusual four-station dial machine utilizes a satellite station outside the periphery of the main dial, at right.

INDUSTRIAL BRIEFS

New Road to Homes—Armco Steel Corp., Middletown, O., has launched a new approach to residential construction, combining suburban comforts and amenities with urban conveniences. Carl Koch & Associates, Cambridge, Mass., specialists in residential architecture, have been retained by Armco. Their initial assignment is to design a multiple-family, garden-type apartment dwelling making the best use of steel.

On Stream—The Power Piping Div., The M. W. Kellogg Co., a subsidiary of Pullman Inc., started production in its new $4 million power piping manufacturing plant. Located at Williamsport, Pa., new facilities include metallurgical and welding laboratories, and an office building which is the new headquarters of the division.

Growing, Growing, Growing—Bohn Aluminum & Brass Corp. is expanding three of its plants. It includes an addition to the Danville, Ill. plant which produces heat transfer equipment. At Butler, Ind., production facilities for permanent mold castings will be added to the plant with additional melting, production and lab equipment. A new engineering plant will be added at South Haven, Mich.

Canadian Expansion — Refractories Engineering & Supplies Ltd., Montreal, will build new facilities at Bronte, Ont. It is affiliated with Kaiser Refractories & Chemical Div., Kaiser Aluminum & Chemical Corp. The basic refractory mixes to be manufactured at the new plant will be under license from Kaiser Refractories.

New Member in Family—A new organization has been formed by J. Holland & Sons, Inc. The new subsidiary will handle all used and rebuilt equipment sales. Called H&S Equipment Sales Co., operations will be conducted as a division of the parent company at 481 Keap Street, Brooklyn, N. Y.

New PMI Officers—At the annual meeting of the Pressed Metal Institute on Oct. 10-14, the following officers were elected: President: M. A. Sherwood, Grand Haven Stamped Products Co., Grand Haven, Mich.; Vice President: W. J. Primrose, Jr., The Dickey-Grabler Co., Cleveland; C. W. Cederberg, Larson Tool & Stamping Co., Attleboro, Mass.

Drawing Plans—Keystone Drawn Steel Co., Spring City, Pa. will increase its manufacturing space by 40 pct in a $450,000 expansion program. A modern building will be erected to house new automatic equipment combining the operations of cold-drawing, straightening, cutting and polishing steel bars. Also, new coil handling, storage, welding, cleaning and annealing facilities will be included in the expansion.

Moved and Settled—Green Steel Co., Dayton, steel service center, has moved to a new warehouse and office building at 1825 Kuntz Rd., Dayton. The new plant occupies 25,000 sq ft and was erected at a cost of $300,000. Green Steel handles flat-rolled steel products and offers various services to steel fabricators and stamping plants.

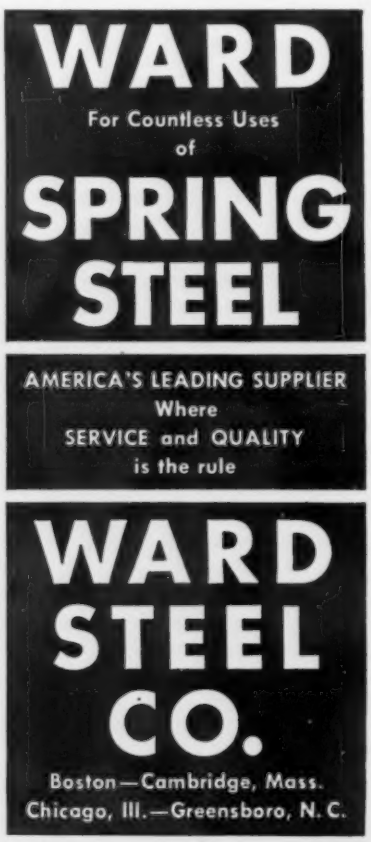
Add and Double—The Chemical and Metallurgical Div. of Sylvania Electric Products Inc., Towanda, Pa., is building a 6500 sq ft addition to the refractory metals processing plant. New facilities will double production capacity for tungsten and molybdenum metal products when completed late this year.

Home in Indiana—Mallory Control Co., Div. of P. R. Mallory & Co. Inc., is building a plant in Frankfort, Ind. The facility designed for future expansion will employ about 550 people when it gets into full production in the spring of 1961. Mallory Controls will manufacture its lines of carbon controls, vitreous enamel resistors, power rheostats, switches, jacks, and plugs in the new plant.

Complete and Completed—Datex Corp., Monrovia, Calif., is now nearing completion one of the most complete control systems designed for steel rolling mill operations. The automatic, card-programmed system will control a 56-in. reversing rougher of a semi-continuous hot strip mill owned by Republic Steel Corp.

All for Defense—Sparton Corp. Jackson, Mich., will build an ultra-modern military electronics facility on a 20-acre site at Albuquerque, N. M. Construction of the plant, to be operated by Sparton Southwest, Inc., a subsidiary of Sparton Corp., will begin this month. Estimated completion date is February, 1961.

CB&I Banks on Tank—Chicago Bridge & Iron Co. will design, fabricate and erect an all-steel elevated tank for water storage. CB&I will build the 3 million gallon spheroidal-tank type for the City of Sacramento, Calif. It will be 77 ft to bottom and is designed for a 6 pct earthquake factor.



SOME FOUNDRY PROBLEMS

ARE **TOUGHER** THAN OTHERS!

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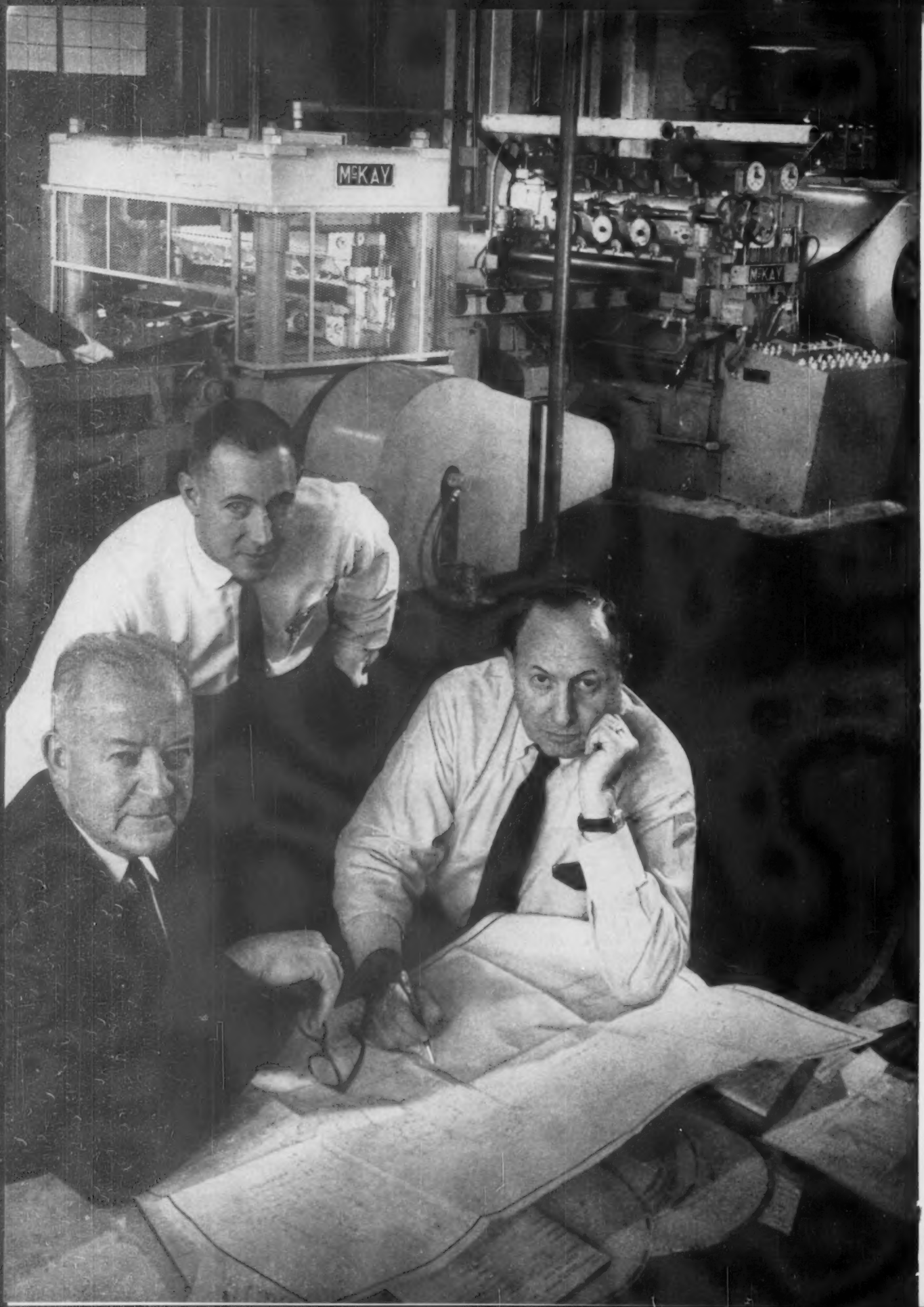
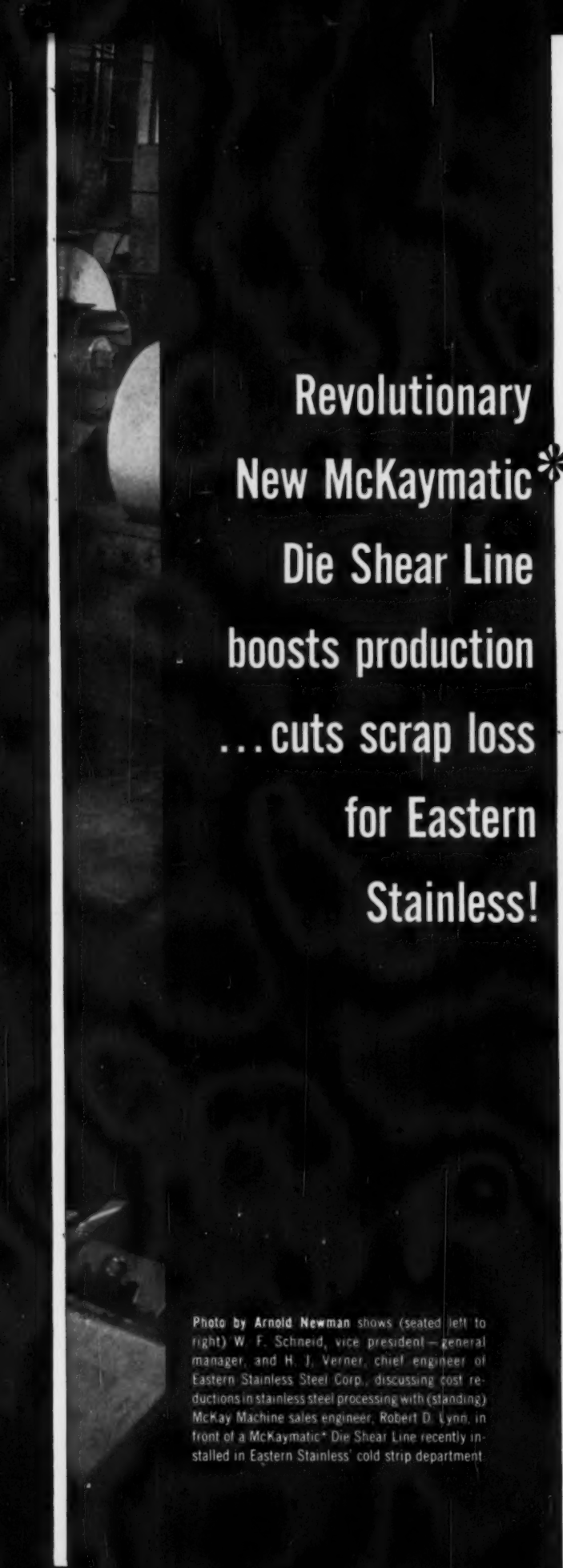
QUALITY SERVICE DEPENDABILITY

Ohio Ferro-Alloys Corporation
Canton, Ohio


McKAY
McKAY



Revolutionary New McKaymatic* Die Shear Line boosts production ...cuts scrap loss for Eastern Stainless!

Photo by **Arnold Newman** shows (seated, left to right) W. F. Schneid, vice president—general manager, and H. J. Verner, chief engineer of Eastern Stainless Steel Corp., discussing cost reductions in stainless steel processing with (standing) McKay Machine sales engineer, Robert D. Lynn, in front of a McKaymatic* Die Shear Line recently installed in Eastern Stainless' cold strip department.

"We consider the McKaymatic* the finest advancement in shearing to come along in a great many years," says W.F. Schneid, vice president-general manager, of Eastern Stainless Steel Corporation, Baltimore, Md. "We have reduced production time, cut our scrap loss, and have recorded an overall increase in department efficiency as a direct result of this new McKay die shear line," Mr. Schneid continues.

Eastern Stainless is a prime supplier of stainless steel sheets, strip and plates, for aircraft and missile parts, for food, chemical, paper and textile machinery and for architectural uses. It produces 25 grades of stainless steel in its own modern electric furnace facilities, and ships about sixty-six percent of it in sheet form.

Programs many grades instantly—Through improved roller leveler techniques, Eastern Stainless found it was able to instantly program many grades of sheet through its new McKaymatic* Die Shear Line. The line decoils, levels in a 17-roll McKay Roller Leveler, measures by electronics and cuts to length—replacing a cut-up, re-level, and re-square operation prior to boxing. Production of cut lengths has been substantially increased.

The result, they report, is cost savings. Says Mr Schneid: "As a result of our efforts to improve customer service, we installed this line to speed up production of these cut lengths. It has enabled us to break a production bottleneck for which there seemed to be no solution."

Line eliminates stretcher leveling—Mr. Schneid continued that production time has been reduced on sheets of five grades as a result of being able to eliminate stretcher leveling and re-squaring procedures. Also, he said, the scrap loss on re-squaring has been eliminated as the sheets are cut clean and square on the McKay line. Net effect of the installation was a definite increase in overall departmental efficiency.

H. J. Verner, chief engineer, remarked that the McKay roller leveler could process these grades of stainless, within its capacity, to flatness approaching that obtained from the stretcher method. He reported that the Die Shear Line is being used to prepare for shipping cold rolled sheet from 4" to 48" in width, up to .050" in thickness, and in lengths from 36" and greater at normal production speeds. He particularly likes the McKaymatic* Die Shear Line for its ability to handle high finish stainless without edge or surface damage.

Available in many sizes—The McKaymatic* Die Shear Line is available in sizes to accommodate most commercial widths. Composed of decoiler (with coil car, if desired), roller leveler, measuring device, and cutoff press, it satisfies most requirements for sheet length accuracy and squareness, flatness, edge and surface quality protection and output rate.

For short runs or long, the McKaymatic* Die Shear Line will better any other line in economy and efficiency. Whatever your cut-to-length problem, McKay Machine's engineers have a solution. Write for literature; send your specific needs for a quotation to *McKay Machine Company, Youngstown 1, Ohio.*

*TM

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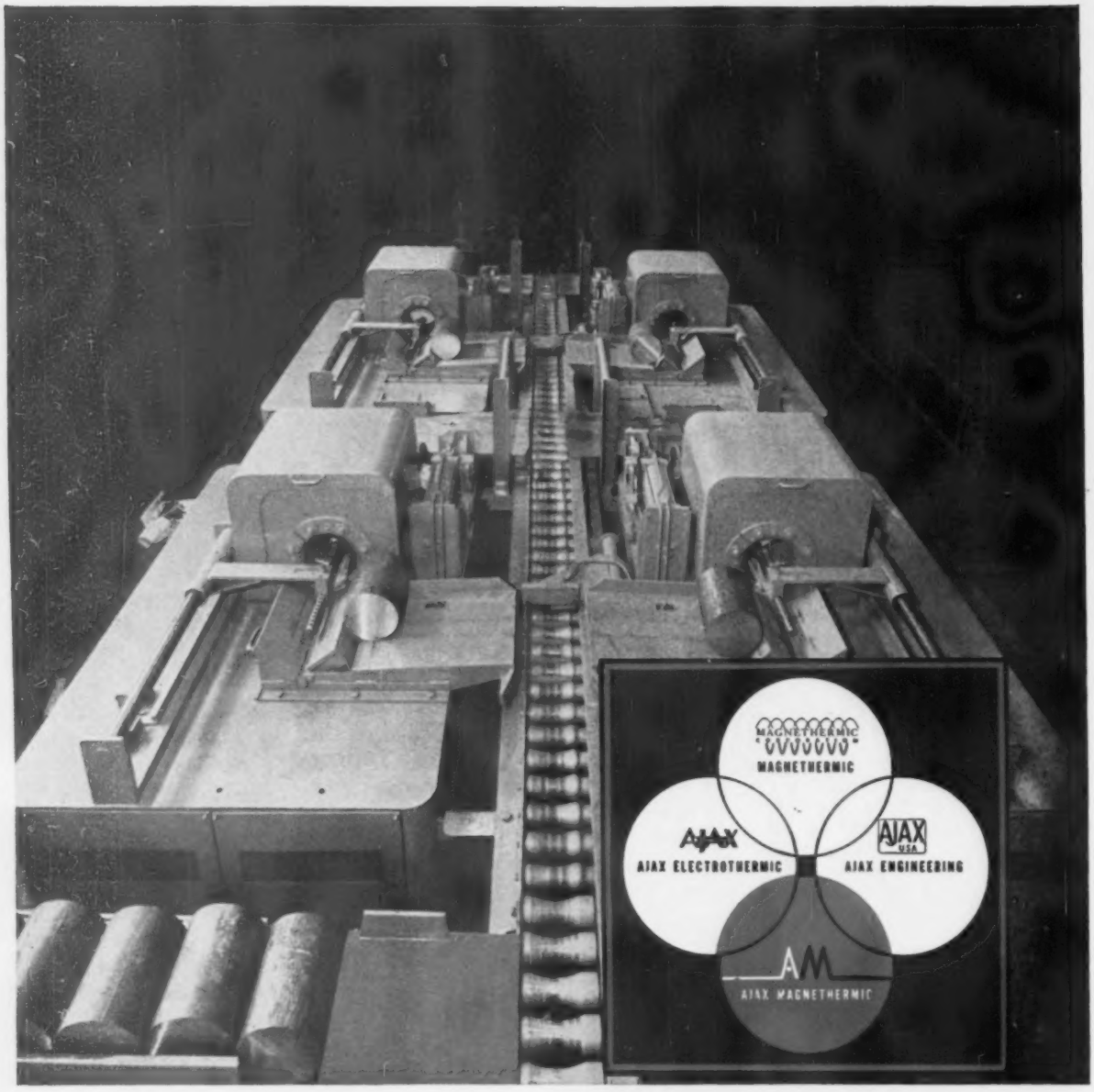
McKAY MACHINE

FOR PROGRESS IN METAL PROCESSING



At Scovill Manufacturing Company, Waterbury, Connecticut, these four Ajax Magnethermic Induction Heaters heat 9" x 16" copper and brass billets for a 2500 ton extrusion press at the rate of 60 billets per hour. Each heater is rated 450 KW. The four heaters in tandem are served by a common loading and unloading conveyor.

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YOUNGSTOWN DIVISION
3990 Simon Road
Youngstown 1, Ohio

W. J. Sampson, Jr., named chairman of the board, American Welding & Manufacturing Co., Warren, O.

Thompson Ramo Wooldridge Inc., Automotive Divisions—**I. A. Binder,** named vice president, Main Plant operations.

Clearing Div., U. S. Industries, Inc.—**E. P. Cunningham,** appointed senior vice president-director, international operations; **E. J. Baumrucker,** appointed vice president, domestic sales.

Borg-Warner Corp., Mechanics Universal Joint Div.—**W. F. Martin,** appointed vice president and asst. general manager.

Pioneer Engineering & Manufacturing Co.—**W. P. Panny,** named vice president.

American Welding & Manufacturing Co.—**H. E. Kaighin,** named executive vice president.

A. P. Green Fire Brick Co.—**J. J. Offutt,** appointed vice president and general manager; **J. W. Swatek,** appointed director, sales, and **H. L. Beynon,** named general sales manager; **W. F. Mundy,** appointed plant manager, Mexico, Mo. operation, and **W. D. Clark,** named manager, all Green Co. plants outside of Mexico.

Bell Intercontinental Corp.—**William Butler III,** elected a vice president.

Refractory Metals Div., Ipsen Industries, Inc.—**C. W. Brunstetter,** named manager.

Sperry Products Co., Div. of Howe Sound Co.—**A. B. Grover,** appointed purchasing agent.

Republic Steel Corp.—**H. F. Kaiser,** appointed division superintendent, Massillon, O. steel plant; **C. W. Leasure,** named divisional superintendent, Canton steel plant on 8th St., N. E.; **J. H. Judy,** appointed chief inspector and **G. M. Gotschall,** asst. chief inspector, Canton steel plant on 8th St., N. E.

Dr. I. A. Oehler, elected president, American Welding & Manufacturing Co., Warren, O.

Freeport Sulphur Co.—**M. F. Dufour,** appointed director, research and development.

Cornell-Dubilier Electronics Div., Federal Pacific Electric Co.—**G. E. Ronk,** named general sales director; **Rear Adm. C. F. Stillman, USN (Ret.)** has been appointed administrative assistant to the vice president, marketing.

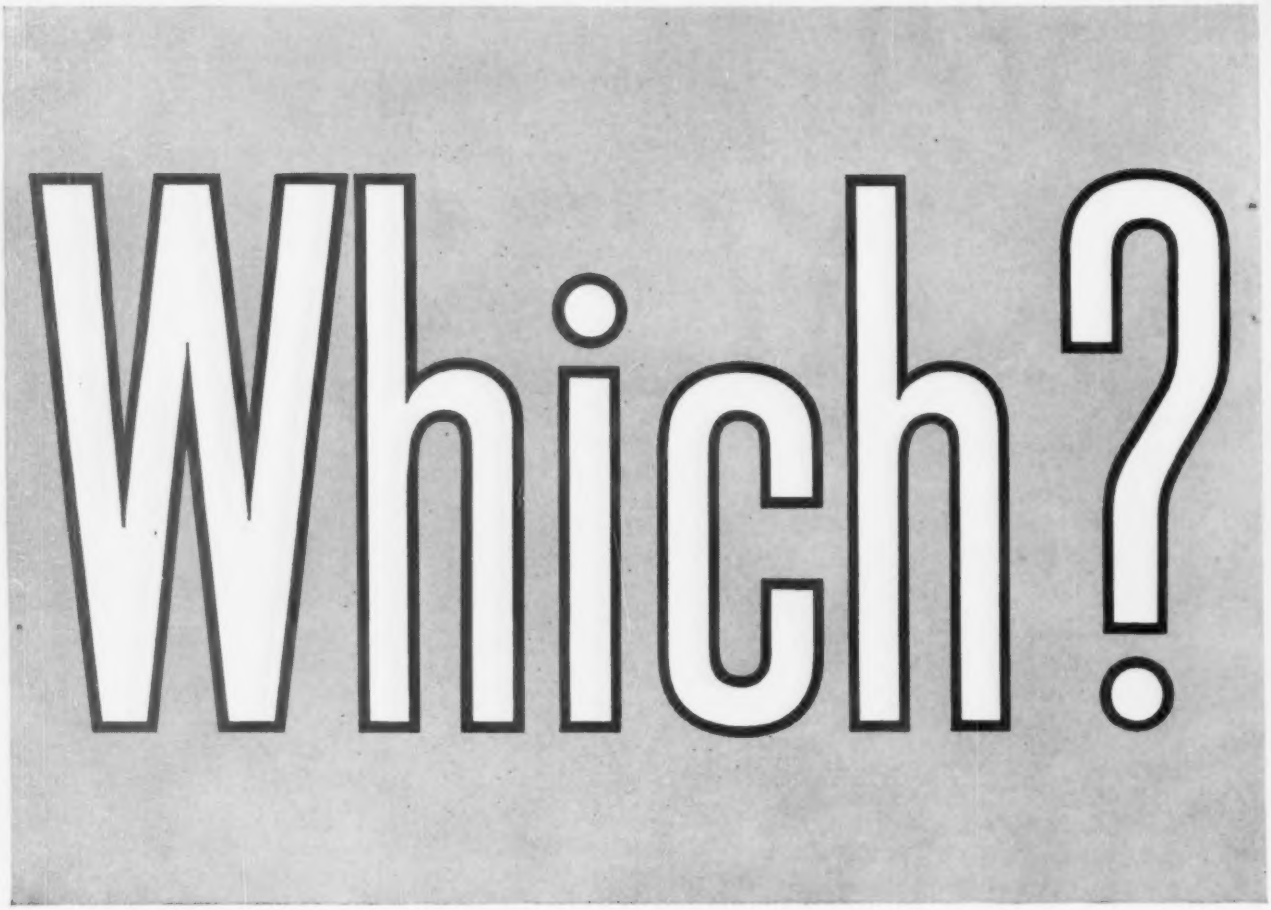
Michigan Limestone, Div. of U. S. Steel Corp.—**D. P. Knowles, Sr.,** named asst. to the district man-

(Continued on P. 84)

H. J. Maubert, elected a vice president, J. I. Case Co., Racine, Wis.

R. H. Landis, elected vice president, sales, Phoenix Steel Corp. of Pennsylvania.

J. J. Selway, appointed general works manager, Claymont, Del. plant, Phoenix Steel Corp.



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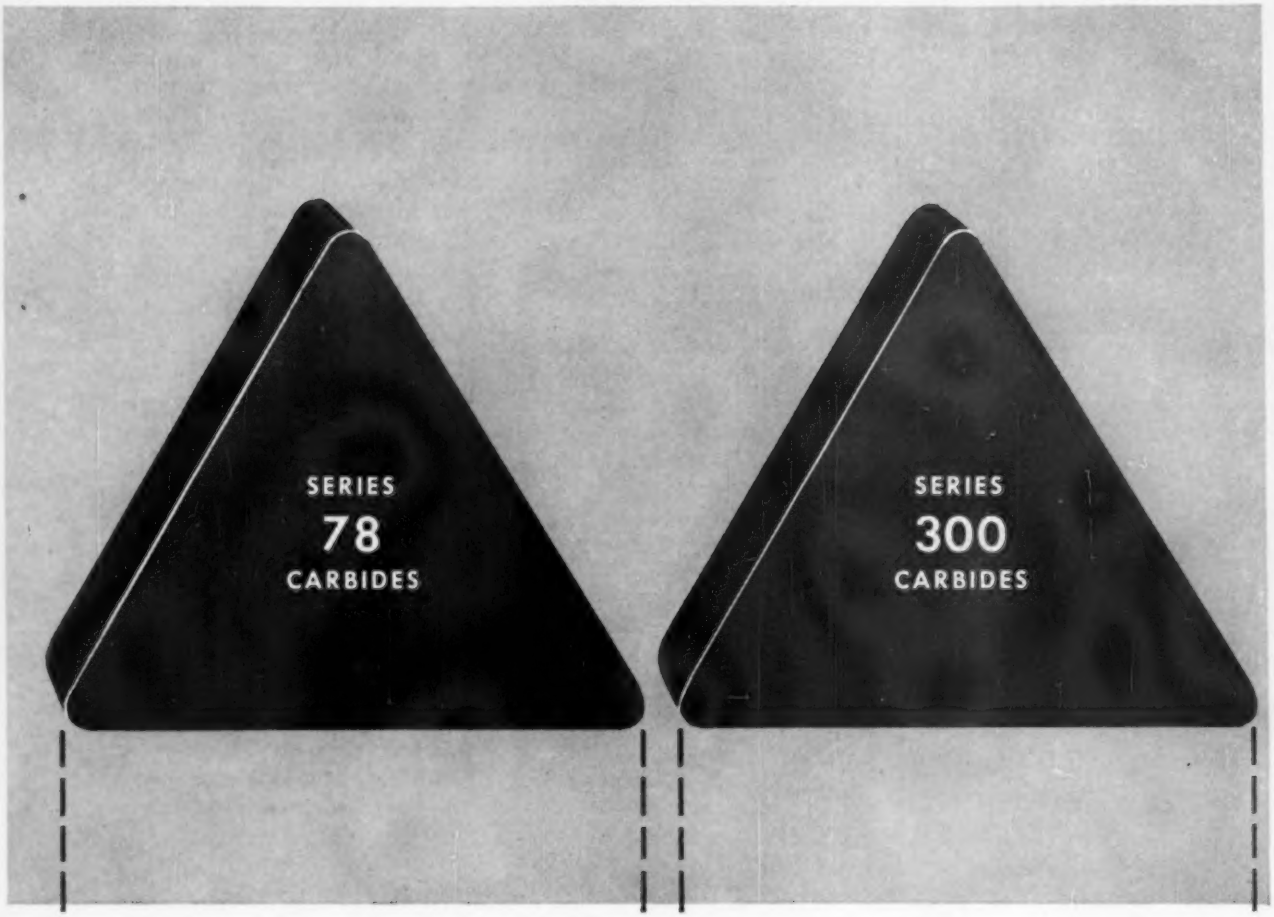
*Carbides in the 78 series are all pre-honed. Carbides in the 300 series are available pre-honed, precision-ground, or utility ground.



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Where machine capacity is limited, the low initial tool cost of 78 series carbides provides real economy in normal steel-cutting operations; offers optimum output-per-dollar. In this series, the improved 78B grade is best to use where carbides are being initially applied to steel-machining operations. *All* disposable carbide inserts in the 78 series come pre-honed to serve you better; save you time and labor.

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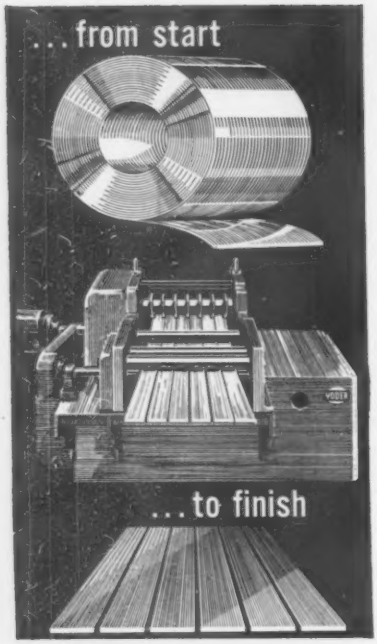

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Additional savings can be realized through lowered inventory of mill-width coils—less waiting for delivery of special slit widths. Also, customer satisfaction will increase as you achieve faster completion and delivery of finished products.

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Send for Yoder's illustrated text on slitting operations and equipment. It describes methods, time studies, operating cycles, material handling, and gives full specifications.

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ENGINEERING YODER MANUFACTURING — ROTARY SLITTING LINES

(Continued from P. 81)

ager, Eastern and Lake Erie districts.

Norton Co.—**J. J. Amero,** appointed chief, vitrified bond unit, Research and Development Dept.

The Gisholt Machine Co.—**R. W. Boyd,** appointed direct sales representative, Chicago territory.

Tennessee Coal & Iron Div., U. S. Steel Corp.—**M. F. Glascock,** appointed staff engineer, Metallurgy, Inspection and Research Dept.; **H. W. Bullard,** named general superintendent, Fairfield Tin Mill, and **J. J. Shannon,** general superintendent, Ensley Works, Birmingham, Ala.

Universal Atlas Cement Div., U. S. Steel Corp.—**J. A. Maloney,** named supervisor, industrial relations, Leeds, Ala., plant.

Spanmaster Crane, Div. of Jervis B. Webb Co.—**F. L. Bateman,** appointed general manager.

Link-Belt Co.—**R. E. Lambert,** appointed asst. general manager, ball and roller bearing plant, Indianapolis.

Surface Combustion Div., Midland-Ross Corp.—**C. W. Sisco,** appointed sales manager, steel mill equipment.

Continental-Diamond Fibre Corp.—**J. F. Rushmore,** appointed manager, sales administration.

Lyon Metal Products, Inc.—**A. W. Piggot,** appointed asst. manager, New Product Research and Contract Sales Dept.

P. R. Mallory & Co., Inc.—**J. L. Wilkes,** named asst. to the president.

Firth Sterling Inc., Carbide Div.—**J. J. Sowko,** promoted to sales manager, product development; **N. E. Donnelly,** to Pittsburgh district manager.

Leschen Wire Rope Div., H. K. Porter Co., Inc. — **Warren Engle,**

(Continued on P. 85)

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Conco CRB Electric Crane used for indoor-outdoor service at Underwriters' Laboratories, Chicago.

(Continued from P. 84)

named Southeastern district manager.

A. M. Byers Co.—**A. C. Hawthorne, Jr.,** appointed a field service engineer, Philadelphia Div. office.

The Timken Roller Bearing Co., Steel & Tube Div.—**R. T. Shipley,** promoted to superintendent, Canton Steel & Tube plant.

Magnetic Metals Co.—**H. D. Risley,** elected treasurer.

Sipi Metals Corp.—**L. H. Strausz,** appointed Detroit district manager.

C. M. Apgar, named manager, shop operations, General Electric Co.'s Specialty Foundry, Schenectady, N. Y.

E. S. Hoopes, Jr., named general manager, Steel & Tube operations, The Timken Roller Bearing Co.

H. R. McLaren, promoted to general superintendent, Steel and Tube plants, The Timken Roller Bearing Co.

R. C. Miles, named director, Engineering and Production Div., Airborne Instruments Laboratory, Div. of Cutler-Hammer, Inc.

OBITUARIES

Albert Singer, 66, president, Singer Steel Co., Cleveland.

J. F. Schaffhausen, 52, president, Martin Steel Corp.

F. J. McWilliams, 59, asst. to vice president, accounting, U. S. Steel Corp.

W. R. Gilbert, 63, chief engineer, C. I. Hayes, Inc. of Cranston, R. I.

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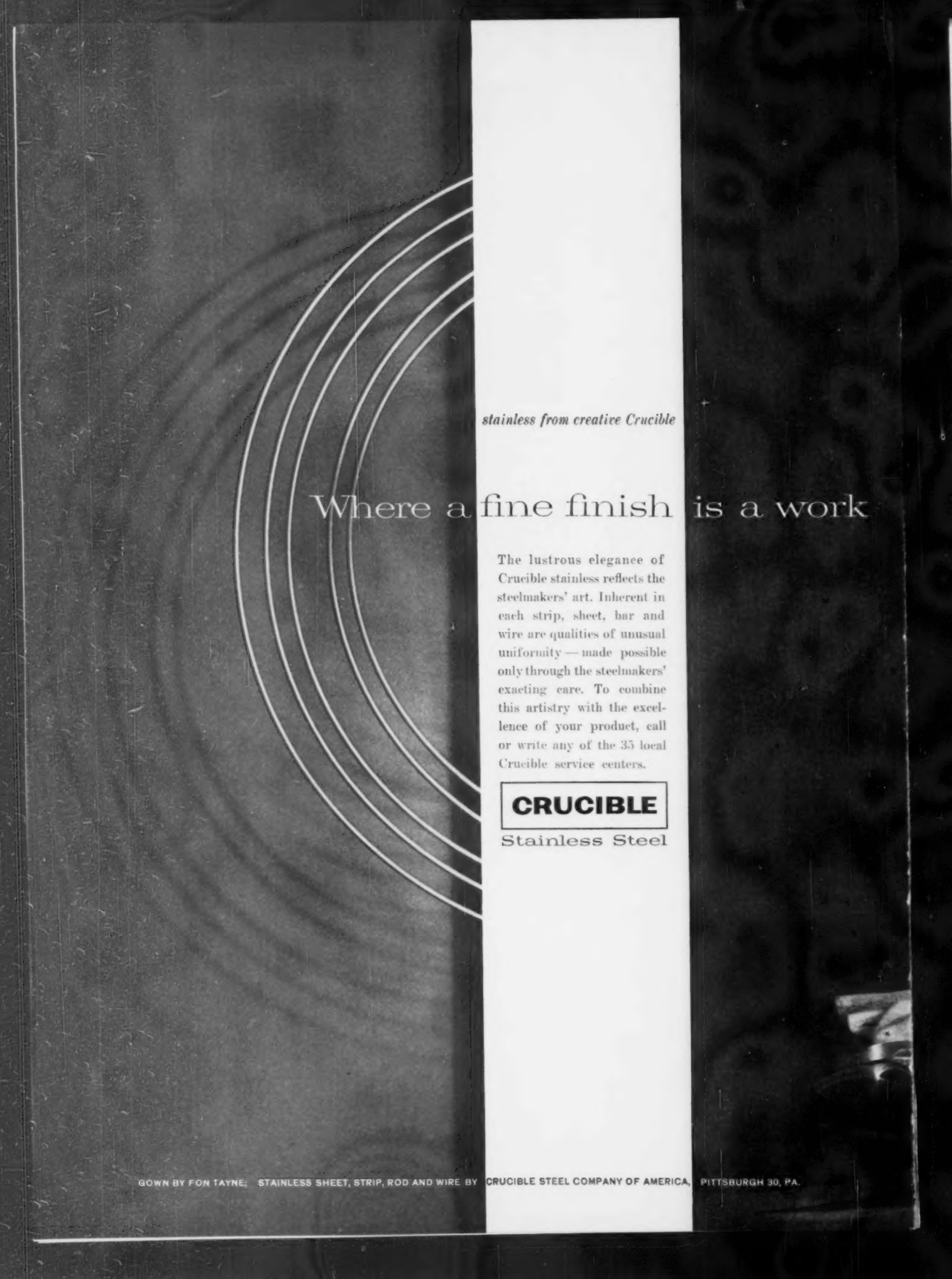
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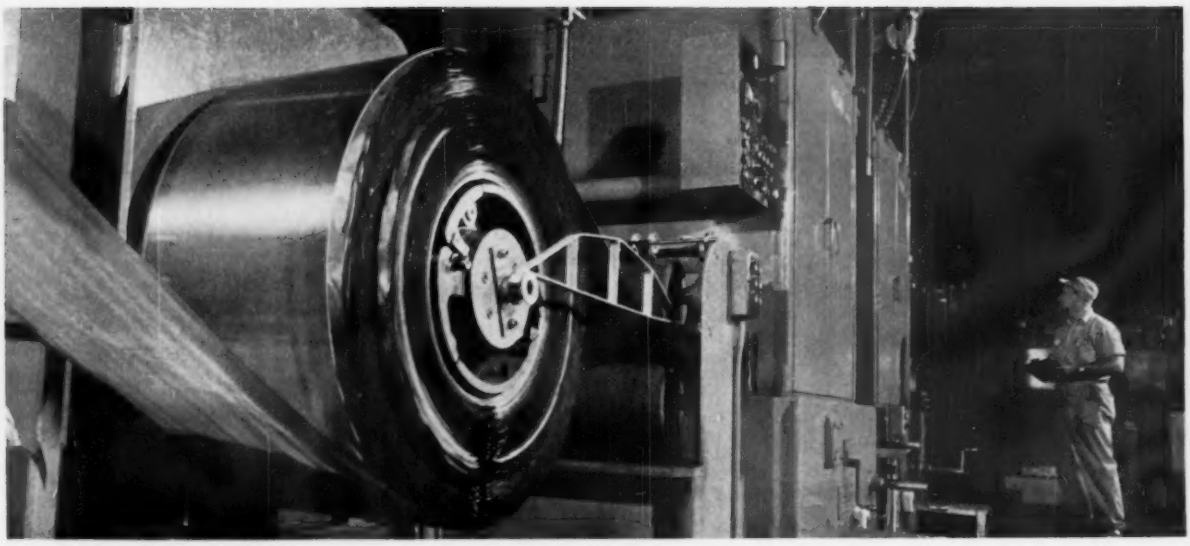


BRIGHT AS A MIRROR: The new wide-belt grinding line handles coils that weigh up to five tons. Protective paper feeds from the extreme left. This paper maintains the high-gloss finish of the ground coil.

Abrasive Belts Remove Crown From Stainless Steel Strip

Crown is a real bottleneck on most strip finishing lines. It's impossible to "pressure out" this metal buildup.

An abrasive-belt grinding line eliminates the crown problem while removing deep imperfections—in a single pass.

By **W. N. Redstreake**
Associate Editor

■ Abrasive-belt machines in tandem, grinding in oil, remove the crown from stainless steel strip up to 28 in. wide. These grinders produce good finishes and hold close tolerances in a single pass.

In rolling any top-quality steel, crown presents a major problem. What is crown? It's the slight buildup in a strip's thickness at or near the middle of a transverse section.

Rolling can't solve this problem. When you roll a coil or strip from thicknesses as great as 0.240 in. down to 0.001 in., crown still remains.

Hard to Cure—It's impossible to "pressure out" the crown. Increasing the roll pressure only causes the crown to move sideways. This ripples the coil's transverse surface. The result is a ruined coil that's only fit for scrap. In fact, sometimes it's so thin that it isn't even good for heavy-melting scrap.

There's only one solution to the crown problem. The crown must be ground out. Once a coil is completely flat, it stays flat through follow-up rolling processes.

A new abrasive-belt grinding line turns out machined-quality stainless steel at the Wallingford Steel Co., Wallingford, Conn. This equipment saves about two-thirds of previous grinding costs. In a single pass, the newcomer holds thickness variations across the strip or coil width to less than 0.0005 in.

Thanks to this unique crown-grinding feature, the Wallingford Steel Co. becomes the first stainless steel producer that's able to supply truly flat strip. Finished strip is now being rolled to 0.001 in., ±3 pct. This strip meets and improves on the exacting tolerances specified for aircraft, missiles and space vehicles.

Use Oil Flood—The new grinding line consists of dual grinders with coated-abrasive belts. These belts run in a flood of sulphur-chlorinated oil at 900-1800 rpm. This produces belt speeds of 2100-4200 sfm.

The dual grinders were made by

The Hill Acme Co., Canton, O., according to designs modified by abrasives engineers from the Behr-Manning Co., a div. of the Norton Co., Troy, N. Y. Engineers from Wallingford Steel also played vital roles in the design and development stages.

Wallingford's new grinding line represents eight years of joint development work. It replaces two former grinding lines which included five machines. In one shift the new line produces an output which previously called for three shifts. At the same time, quality is greatly improved.

Salvages Scrap—A major economy being realized with the new line centers on its ability to remove deep imperfections. The new line salvages entire coils which formerly had to be shipped back to the mill for remelting.

Quite often, these imperfections were too deep for the old dry-grinding lines to handle. This condition is especially common with exotic metals such as titanium and zirconium. These metals and other special alloys aren't strangers to the new abrasive-belt machines.

E. B. Cleborne, president of Wallingford Steel Co. and a vice-president of the Allegheny Ludlum Steel Corp., says that the ability to remove crown, first demonstrated at Behr-Manning, was the key factor that led his company to invest about $300,000 in the new line.

"This investment," Mr. Cleborne states, "will be repaid in a surprisingly brief time. The new line gives Wallingford a clear leadership in supplying strip without the troublesome crown hitherto considered inevitable."

Opens New Fields—"With this line," he adds, "we are already shipping stainless strip that's ground to a flatness which meets aircraft and missile specifications.

"The aircraft and missile industries have been clamoring for such strip for at least four years," says Mr. Cleborne. "But, until now the steel industry had no way to supply it. Of course, such a product will offer great advantages for countless conventional applications as well."

Early estimates pointed to potential savings with the new line of nearly $91,000 per year. These estimates covered direct-labor and abrasive-belt costs. It's already clear that actual savings will exceed this figure.

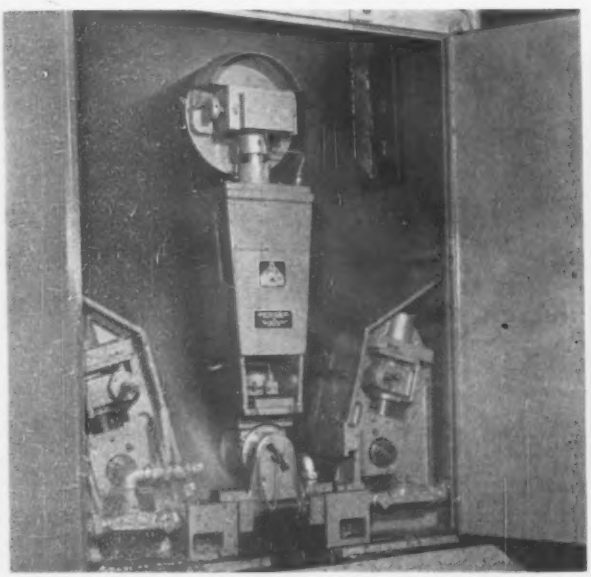
About 25 pct of the plant's output will be ground on the new line. A 10-coil order is now filled in 12 hours. It took 65 hours to fill such an order—before the introduction of the new line.

Previously, an average of three passes was needed to remove defects from one surface of a coil. This meant that only two complete coils were processed on each eight-hour shift. In addition, four or five belts were used to grind each side of a coil.

Basic Tool—E. C. Schacht, president of the Behr-Manning Co., hails the new line as a basic industrial tool. He says this development illustrates the total recognition of the coated-abrasive belt as a primary forming tool.

"It's r e a s s u r i n g," says Mr. Schacht, "to observe this and similar results from a product-engineering program which has seen our engineers working closely for many years with machinery m a k e r s. They've repeatedly upgraded the design of grinders and other machines.

"These developments match the potentials we knew coated-abrasives



FAST CROWN REMOVAL: Coated-abrasive belts remove crown at speeds up to 4200 sfm. Oil floods each grinding head at a rate of 65-100 gpm. The stainless strip feeds through the line at 6-36 fpm.

QUICK REVERSAL: When multiple passes are required to improve the finish, the operator turns two knobs. This reverses the line's direction. At all times, endwise tension on the strip remains at 30,000 lb.

possess," he adds. "Other and equally important advances are within sight."

Dual Stages—The new grinding line consists basically of two 60-hp vertical grinders. These grinders, running in tandem, each drive 30- x 126-in. cloth belts. The belts are all-resin bonded with aluminum-oxide or silicon-carbide abrasives. When high polishes are required, less aggressive glue-bonded belts of cloth or paper are used.

Unlike earlier dry-grinding equipment at Wallingford, these belts grind in a flood of sulphur-chlorinated oil. The oil is pumped to each grinding head at a rate of 65-100 gpm.

The chlorine in the mineral-base oil prevents chips from "welding" to the coil. It also cleans the belt. A 4000-gal reservoir and a filtration system insure top service from each drop of oil.

Several novel features combine to flatten the strip as it approaches the abrasive belt. Each coil is kept under an endwise tension of 30,000 lb. As it approaches the belt, it's sharply bent at an angle up to 20°.

Handles Heavy Strip — Break rolls impart the angle to the coil as it enters and leaves the grinding area. A solid-steel billy roll or work-support roll, eight-in. in diameter, forces the strip against the belt by hydraulic pressure. These heavy components allow the machines to handle strip up to 0.240 in. thick.

Contact rolls are knurled steel or serrated rubber. The latter rolls range from 45-90 Durometer hardness. All rolls are dynamically balanced. The rolls operate at 900-1800 rpm to give belt speeds of 2100-4200 sfm.

Work feeds to the abrasive belts at speeds from 6-36 fpm. The feed rate depends upon the depth of cut, type of stock and the surface finish desired.

Removes Imperfections — On tube-mill stock, for example, a 90 Durometer serrated-rubber-contact roll is used on both grinders. This provides the best finish and maximum production along with optimum stock removal.

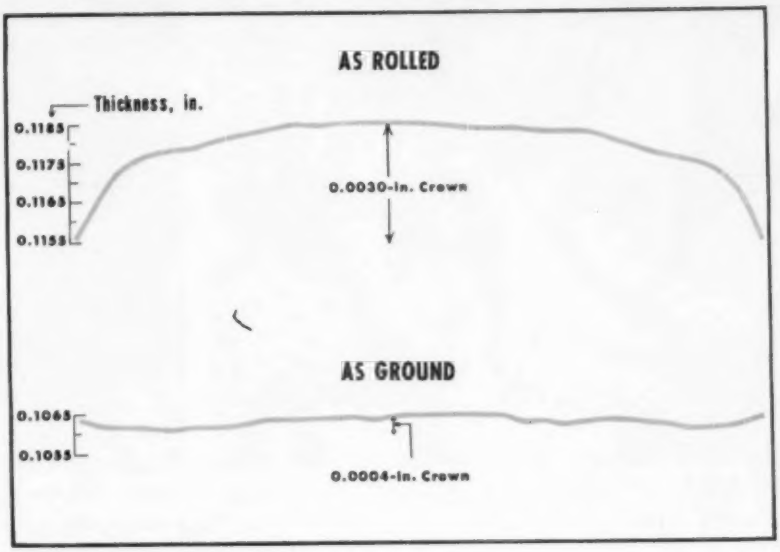
Feed rates in this case range from 18-20 fpm. Actual feed rate depends on the severity of the imperfections.

The first grinder uses an 80-grit, aluminum-oxide belt and operates at 2100 sfm. The second grinder uses the same type of belt; but it operates at 4200 sfm. Each side of the strip receives one pass.

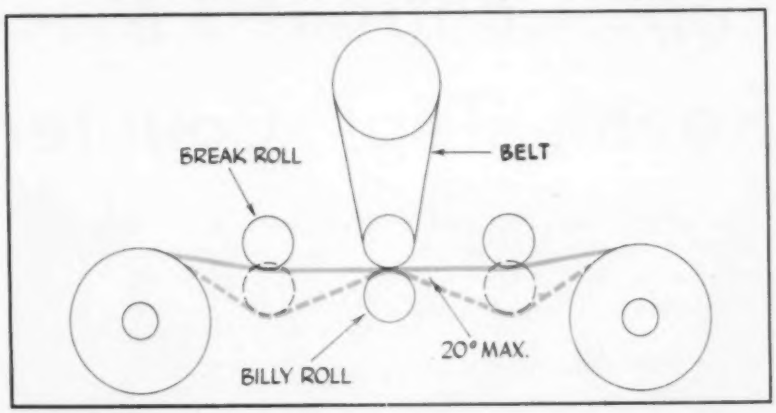
Three for One—A comparison of oil versus dry grinding on this tube-mill stock shows one pass as against the former three. Only one belt is now consumed instead of four and one-half. However, the major savings is time. Now it takes 63 minutes to process the stock—instead of 134. Both of these time factors include coil handling.

An X-ray gage, on the line, automatically traverses across the strip. It records the strip's thickness on a moving reel of paper. Thus, a complete record of every strip or coil is constantly on hand.

How Crown Profile Improves



Break Rolls Keep Strip Flat



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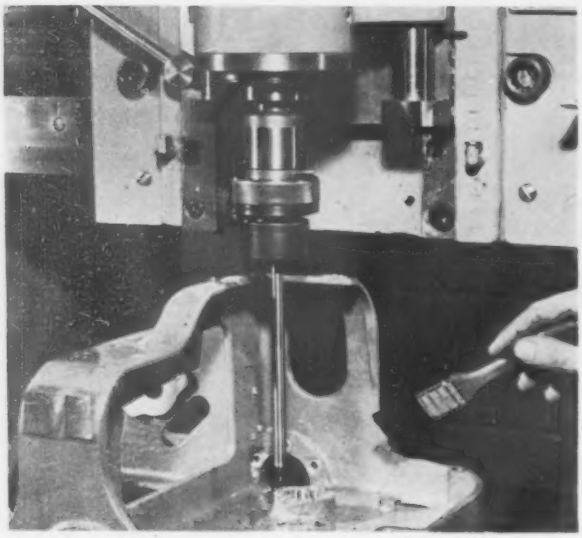
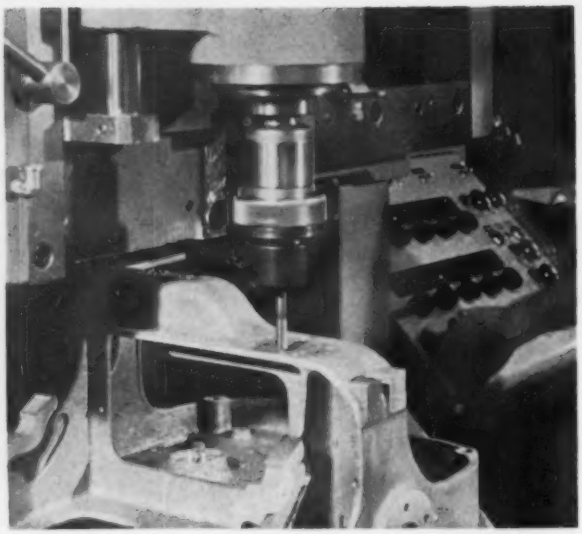


LIGHT DRILLING: Small diameter holes are drilled at speeds up to 2600 rpm and feed rates up to 21 ipm.



HEAVY TAPPING: Easily-programmed unit taps large diameter holes. Manual control is also provided.

Tape-Controlled Machine Drills, Reams, Taps, Counterbores

Most people think that tape-controlled machine tools aren't adaptable to short work runs. These people are away off base.

At a major jobbing shop, a tape-controlled unit handles prototype parts or short runs.

■ All phases of drilling, tapping, reaming and boring are fully controlled and programmed on a new machine tool at the Schwartz Boring Co., Inc., Detroit.

The new unit programs a given tool to varying levels and varying tool depths—without any operator attention. Spindle feed rates are controlled by punched tapes, or by dial settings. Thus, manual control is also an inherent feature of the new unit.

This versatile machine tool is a Hillyer Numerically-Controlled Drilling Machine, Model F-36C. It's a product of the Hillyer Corp., Cranford, N. J.

Many Uses—In addition to drilling, tapping, reaming and counterboring, the machine handles spot facing, location boring and straight-line milling. It's especially useful for short work runs and for other complex machining needs. The newcomer earns its keep on a wide variety of jobs.

A dial-control panel and a tape reader are mounted integrally with the machine. The entire assembly takes up 78 x 100 in. of floor space.

The tape reader uses either a 4-in., direct-reading, decimally-coded plastic tape or Flexowriter 1-in. paper tape. Tape preparation is simple. Using a hand punch, an unskilled apprentice punches his own tapes.

Easy to Program—All tapes are punched in decimal form. For this reason, specially-trained personnel aren't required. A simple keyboard-operated punch speeds the tape preparation. At the end of each program cycle, the tape is automatically rewound.

An apprentice operates the new machine tool at Schwartz. Holes are located and drilled to accuracies of ± 0.001 in. per foot, with production up to 15 holes per minute.

Schwartz specializes in machining prototypes and experimental parts. Therefore, absolute precision is a vital factor. Some of America's leading automotive and aircraft manufacturers depend on Schwartz for prototype and/or full-production runs.

Eight Spindle Speeds—Maximum spindle speed for the automated unit is 2600 rpm. The desired rotational speed is fixed through a series of eight steps on the control panel or by corresponding holes that are punched in the tape.

These eight steps are spaced to

give optimum coverage of the total range. Other spindle speeds include: 400, 520, 670, 900, 1200, 1550 and 2000 rpm. Either the operator or the automatic control media can readjust the speed at any time, with no appreciable time delay.

Punched tapes or dial settings also control the spindle's feed rate. Each feed rate is selected as a separate setting, and the steps are denoted by the numbers one to six.

Hillyer's standard feed rates are 1, 2, 3, 5, 8 and 11 ipm. However, the unit at Schwartz has a top feed rate of 21 ipm. It has alternate feed rates of 3, 6, 10, 12 and 18 ipm.

Known Feed Rates—Preset feeds are maintained by a hydraulic-servo device. This device's action is independent of oil pressure, oil viscosity or the load on the tool.

Feed rates are often changed while drilling is in progress. But once a setting is made, the machine maintains the feed rate regardless of changes in the part's machinability. Only a command from the tape—or a change in the manual controls—will alter a fixed setting.

Now, let's follow a work run through the Schwartz shop. The case we'll study centers on 25 inertial platforms. Received as castings, these platforms require a lot of machining. Seven surfaces on each casting must be milled.

Cuts Set-up Time—These platforms aren't strangers to the company's shop. Earlier groups were machined on a complex setup that consisted of a tilting table and various sized set-up blocks. Why was the blocking needed? Because the castings have irregular shapes.

With the old setup, it took 4 hours and 58 minutes to machine each platform. And this time doesn't include delays caused by frequent changes in the setup. Set-up time averaged 1 hour per side.

Use of the new machine allows savings in both time and material. Scrap aluminum plate now serves as the machining fixture. Eight standoffs are affixed to the base to compensate for the irregular casting.

The Hillyer machine drills and taps each steel casting on end. Banking and location plugs speed this work. Standard clamps, in the T slots of the machine, hold the work in position.

Costs Tumble—It takes 52 minutes to machine each platform. Total set-up time for an entire assembly has dropped to about 60 minutes.

The case in point centers on 25 platforms; but each work run consists of only 5 completed assemblies. Naturally, a tape had to be punched prior to the first run.

However, even though it took 4½ hours to punch the tape for these complex parts, a total of 22½ set-up hours were saved on the first run. Actual savings in machine time for the first 5 parts exceed 20 hours.

Wide Choice—Hillyer offers several accessories for the machine. One of the mose useful is a direct-recording tape punch. It was designed for drilling printed wiring-circuit boards—when actual dimensions of hole locations can't be predicted.

This accessory also proves useful for other types of work. It allows punching of a tape directly from the operation on a part. As the hole locations are determined directly from the part, tape preparation also takes place. Thus, subsequent parts can be machined with no measurements or computations.

In practice either the drill itself or an optical finder is inserted in the spindle. The operator positions the finder (or drill) by means of fine- and coarse-adjustment dials and pushbuttons. All controls are close to the working area.

Rotary tables are available along with machines that have multiple spindles and drilling capacities up to 1¾-in. diam. Four different turret models are offered. These units have from five to eight spindles, all encompass fully-programmed drilling, reaming and tapping.

COMPLEX SHAPE: Tape controls speed production of aerospace parts such as gimbals. These gimbals serve as leveling platforms for the guiding gyroscopes inside missiles. Accuracy is a very vital machining factor.

New Moly Reference Blocks Improve Sonic Testing

By **R. C. Rhoades,** Director of Quality Control, Climax Molybdenum Co., New York

Checking billets against possible flaws will guarantee a sound end product.

One company redesigned its ultrasonic reference blocks to offer even higher quality.

■ A new advance in ultrasonic immersion testing raises the quality of our space age products. Reference blocks used in the testing process take on a new look—but not without reason.

New designs provide a much more accurate method of checking metals for internal defects. This quality boost reflects better performance in the end product. Consider first the material.

Climax Molybdenum Co. uses reference-block material that compares to the composition of the part being checked. The company replaced conventional SAE 4340 reference blocks (3in. diam x 3⅜ in.) with two half-cylinder blocks made of recrystallized molybdenum forging material.

Accent on Design — The moly blocks each measure 6½ in. long with a radius of 3 in. One contains 5/64 in. diam flat bottom holes at depths of 2½, 2, 1½, and 1 in. for longitudinal calibration.

The other contains the same size holes at depths of 2¼, 1¾, 1¼, and ¾ in. for shear wave calibration. The new blocks triple the sensitivity of the test procedure used to detect defects in molybdenum billets. Let's cite an example.

Steel blocks require that a power setting of 30 be placed on the tester to detect a reference hole 3 in. below the surface. On the other hand, the new moly blocks require a setting of 95 to detect a reference hole 2½ in. below the surface.

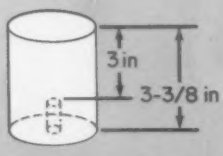
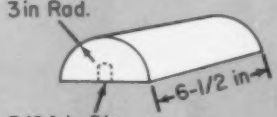
This means that a defect in a molybdenum billet would be picked up at a setting of 95 with the moly blocks, but would be missed at a setting of 30—the figure needed to program the checking unit at roughly the same depth.

Complete Program — Ultrasonic testing is only one of the many quality control measures which Climax employs to keep the rejection rate at less than 1 pct.

The program starts with a careful analysis of the raw materials. The company uses virgin molybdenum powder containing 99.96 pct pure molybdenum and carefully selected

How New Designs Affect Sensitivity

REFERENCE BLOCK DEVELOPMENT FOR ULTRASONIC TESTING OF FORGING BILLETS

	Conventional Designs		New Designs	
Power Input	30	50	95	95
Shape				
Material	SAE 4340 (Normalized)	Extruded Molybdenum	Molybdenum Forging	Molybdenum Billet Stock
Tests Performed	Longitudinal & Shear	Longitudinal & Shear	Longitudinal & Shear	Shear
Results		Twice As Sensitive As SAE 4340 Blocks	Over Three Times As Sensitive As SAE 4340 Cylindrical Blocks	

high-grade melting stock. The program has its roots in two production process factors that are basic to high ingot yield and consistent quality. First, the small diameter of electrode permits easy gas removal during sintering.

Secondly, the low diameter ratio between the sintered molybdenum electrode and the ingot mold, at high temperatures in a vacuum, produces an environment conducive to thorough deoxidation during the melting stage.

Checks Residuals—The two process factors also have an important bearing on the extent of the metallic residuals in the finished product. Spectrographic analysis of incoming powders to assure that residuals are below specified limits is even more important.

Some residuals such as iron and silicon, for example, cannot be completely reduced during melting.

Ingots are subjected to metallographic testing in both the as-cast and forging billet stages. After casting, disks taken from the ingot are tested to determine the extent of oxidation in the grain boundaries. If oxidation is excessive, the ingot is rejected at this point because it cannot be corrected.

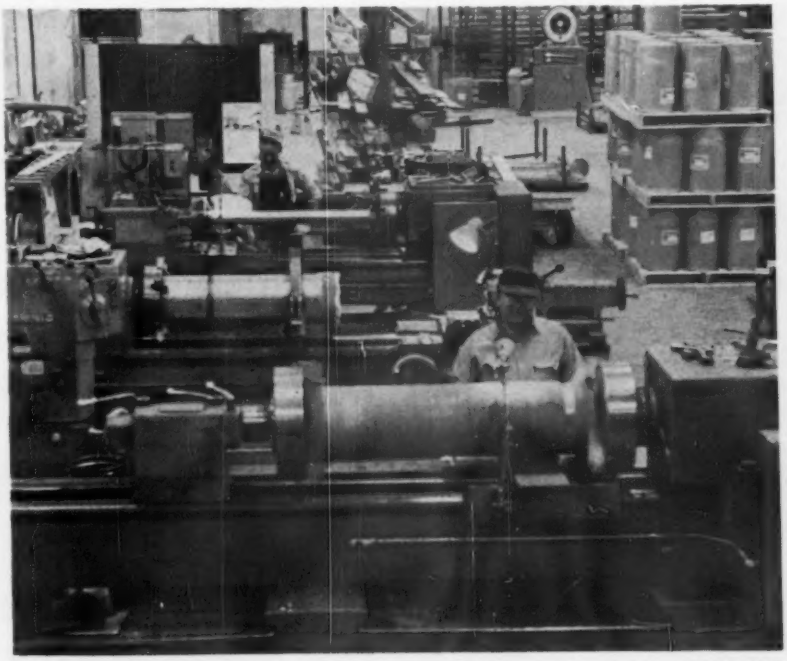
The finished forging billet is checked for grain size. Climax maintains an ASTM grain size of 4-6. This range provides optimum physical and mechanical properties.

Surface Finish—Critical surfaces are inspected by fluorescent testing. Surface seams show up as minute lines, and pits as dots, both readily visible to the naked eye.

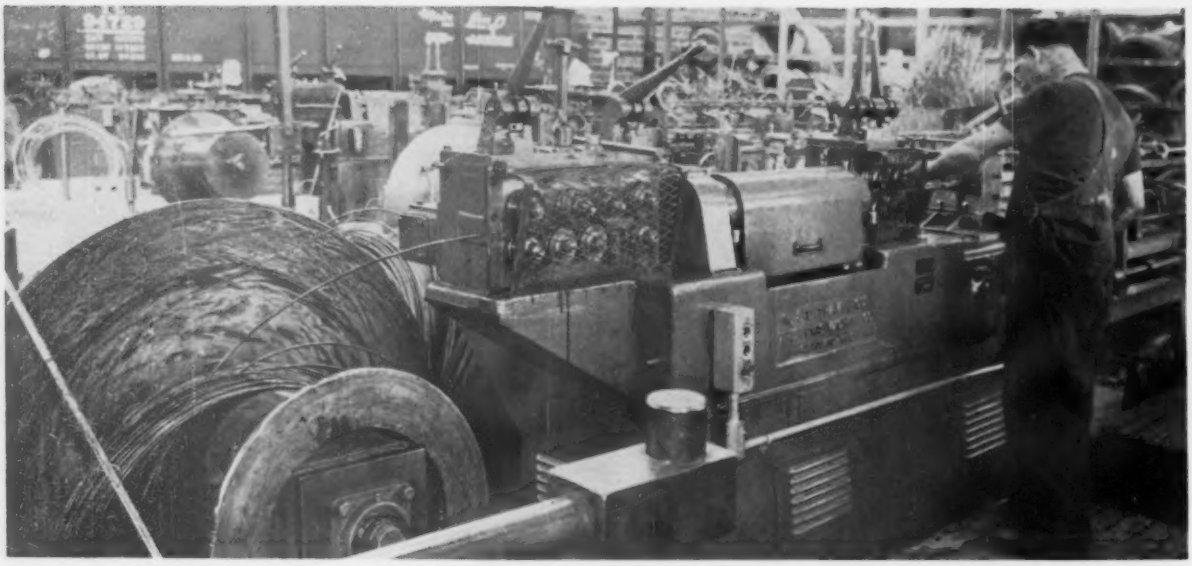
Where surface roughness specifications are exacting, each piece receives a profilometer check. Here, a pin-point sensing head is drawn along the entire length of the piece to rate the surface finish.

To assure that every bar is uniformly crystallized, Brinell hardness tests are taken along the surface and cross-section. Records show that a hardness of less than 170 Bhn is attained.

CHECKING BILLETS—The ultrasonic immersion tester shows a threefold increase in sensitivity when molybdenum reference blocks are used.



SURFACE CONTROL—Billets are turned to a surface finish of 100-400 rms. Exacting roughness specifications are held by using a profilometer.



STRAIGHT AS AN ARROW: Steel coil feeds through rolls into a straightener. It emerges as straight bars.

Power Shafts Pose Question— How Straight Is Straight?

By **F. J. Robbins,** Vice President, Bliss & Laughlin, Inc., Los Angeles.

Most of the wheels of industry turn smoothly on straight power-transmission shafts.

Today, these shafts have to run at ever-increasing speeds. They must also handle heavier and heavier workloads.

■ Most forms of power transmission depend upon straight, cold-finished steel shafts. Erratic shafts won't keep the wheels of industry turning for long.

Recently, straightness has emerged as a renewed problem. However, many phases of this problem are quite old. It's always been a problem to produce mechanically-straight bars for shafts. Once these bars are made, it's tough to preserve straightness.

Offers Challenge — Long shafts present a greater challenge than short ones; but few shafts are immune from the straightness problem. Sometimes it crops up when the shafts are being made. Other times it occurs after assembly. In the latter case, a bent shaft may be the result of an overload—or it may be due to rough handling during shipment.

New factors also contribute to the problem. Almost everything that's mechanical is now being built to run at ever-increasing speeds. Add to this a nation-wide effort to reduce costs by stepping up volume and by using heavier loads.

The end result is that heavier demands are being made on power-transmission shafts. Therefore, the metalworking industry should take a new look at its straightness requirements.

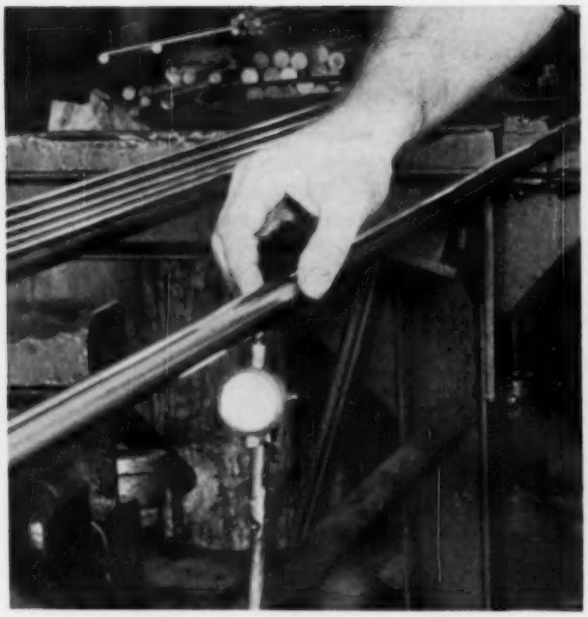
Plants that make cold-finished steel bars are especially concerned. Why? Because they supply large tonnages of steel for shafting purposes.

Experience Counts—For this reason, the makers of cold-finished bars are in a favorable position to answer a vital question: How straight is straight? These manufacturers have been working on the problem for a long time.

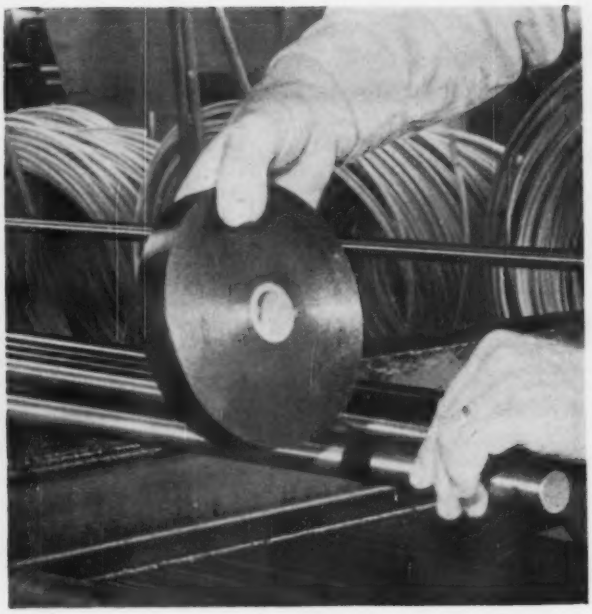
Equipment used throughout this industry is relatively standard. As a result, the standards of straightness obtained with the equipment are for the most part common to the entire industry.

All such equipment is based on the same principle. First, the bar is bent past its yield point to a point of permanent set. The trick is to bend the bar in one direction, then bend it back uniformly so that it leaves the machine in a straight line.

There's a basic deviation to this



FINAL CHECK: To insure optimum straightness, operator checks bar's TIR with a dial indicator.



AVOID DAMAGE: Straightness in metal bars is perishable. Taped ends prevent rubbing and scoring.

principle. It's called stretch straightening. In this case, the machine pulls the bar in tension slightly past its yield or flow point. However, this method isn't used to any great extent.

Important Function — There are many machines that use the initial-bend principle. The prime function of these machines is to straighten bar sections — particularly rounds and tubes. Both of these shapes form the basic raw material for shafting.

Of course, the machines perform other functions. They polish and size the bars. Some units even correct out-of-round conditions. But all of these operations are incidental to the job of straightening.

Work which precedes the final straightening affords a chance to aid in straightening. In cold drawing, for example, proper die design keeps residual stresses uniform within the bar. Good alignment also helps to maintain optimum results.

All of this is only incidental to the consumer's question: What degree of straightness can be expected from a producer of the raw material? And how will these operations affect the price of the bar stock?

Many Meanings—Let's examine the problem of straightness. It's a term with quite a few meanings. There are many degrees of straightness. Commercial straightness is generally considered to apply to material that's produced by a single pass through a straightener.

Today, some straightening requirements have become more exacting. To meet these needs, bars pass through the machines a second time.

Sometimes you must obtain a degree or standard of straightness which is beyond that normally provided by the supplier. Costs pile up when such a case arises.

Often, hand straightening may be the final recourse. This is slow and very costly. But it produces what is needed for certain highly-specialized needs.

Hand straightening should be applied rarely—and only in extreme cases. Before you resort to this extreme, you should consider a more practical solution. Can you change your requirements to avoid the need of costly and time-consuming hand straightening?

Severe Service — Some requirements are a great deal more critical than others. A case in point is the automobile drive shaft. It must stand up to severe field service over a widely varied terrain. It must also withstand a wide range of speeds—with little, if any, trouble.

Drive shafts have to be well aligned in their bearings and accurately splined at both ends. These requirements must be met. They enable a shaft to fit into the transmission and the differential. Hence, straightness is important to the automaker and to the man who drives a car for long periods of time.

As car speeds increase and as loads get heavier, the degree of straightness becomes more and more critical.

Another application that demands optimum straightness centers on pump rods for the centrifugal-pump industry. Acreage watered by irrigation continues to increase. This means that wells must be driven deeper as table land waters subside. As a result, pumps have to work harder. Today, many pumps operate at 1500-2000 rpm at depths of about 1000 ft.

Costs Can Mushroom — Again,

precise alignment of shaft and bearings is essential. Since most pumps operate at long distances from repair and maintenance shops, dependability is a prime factor.

It's expensive for a farmer to pull a pump from the ground to replace a shaft. This cost snowballs into other expenses. What happens if the pump's shaft fails just when the crops are crying for water?

On the other hand, there are many applications where precise straightness isn't needed. Consider bars that are intended for fabrication on multiple-spindle, automatic-screw machines, lathes or similar equipment. Here the degree of straightness must only be enough for collet acceptance. Since most of the parts made in this manner are short, the problem of straightness is simple.

Note Your Straightness Needs

ITEM	SIZE & SHAPE	STEEL GRADE	STRAIGHTNESS REQUIREMENTS*
Cold-Drawn Applications			
Electric-Motor Shafts (Small)	¼-½ in. Round	C 1045	Straightened by customer after machining to less than 0.004 in. per foot
Electric-Motor Shafts (Small)	33/64 in. Round	C 1045	Straightened to 0.005 in. max TIR per foot to eliminate vibration and noise
Blower Shafts (Heating & Air Conditioning Equipment)	1 in. Round	C 1018	Straightened to 0.010 in. max TIR in 43 in. Customer straightens with peening mallet when necessary to eliminate vibrations
Line Shafts (Deep-Well Centrifugal Pumps)	1-1½ in. Round	C 1018	0.002 in. max TIR per foot. Pump companies straighten to 0.0006 in. max TIR per foot.
Propeller Shafts	1 1/32 to 1 3/32 in. Round	Special Processed Alloy to 125,000 psi min Y. S.	Straightened to 0.010 in. max TIR in 66 in. lengths to eliminate whip, reduce noise, and insure clean-up in min grind.
Shafts & Rolls (Color Presses)	1 5/32 to 2 1/32 in. Round	C 1117	Straightened to 0.0033 in. max TIR per foot. Customer press straightens when required for grinding.
Machine Guides	⅜ x 3 in. ¾ x 2½ in.	C 1018	Straightened to 0.010 in. max camber per foot.
Rail (Automatic Bar-Feed Accessory)	¾ x 1 in.	C 1018 Stress Relieved	Straightened to 0.005 in. max camber per foot.
Guides (Cement-Block Machines)	1½ x 6 in.	C 1137 Stress Relieved	Straightened to 0.002 in. max camber per foot.
Turned & Polished Applications			
Pump Shafting (Deep Well)	¾ to 1¼ in. Round	C 1018	0.001 in. max TIR per foot to eliminate whip and vibration
Hydraulic Pistons	1¼ to 2 in. Round Stress Relieved	C 1144	0.002 in. max TIR in 12½ in.
	2½ in. Round	C 1045	0.004 in. max TIR in 12½ in. Insures clean-up in min grind removal, good alignment and proper operation.
Fan Shafts (Air Conditioning, Ventilating & Freezing Unit)	1¾ to 3½ in. Round	C 1018	0.00066 in. max TIR per foot. Customer straightens to eliminate vibration and permit easy assembly into bearings.
Blower Shafts	2¾ in. Round	C 1018	0.002 in. max TIR per foot.
Cam Shafts	4 in. Round	C 1018	0.001 in. max TIR per foot to permit insertion of the shaft through several bearings.
Drawn, Ground & Polished Applications			
Shafting (Cloth-Weaving Machine)	⅝ & ¾ in. Round Stress Relieved	C 1212	0.002 in. max TIR per foot. Customer hand punches to 0.001 in. max TIR in full bar length.
Pump Shafting	1 3/16 in. Round	C 1018	0.002 in. max TIR per foot. Customer straightens to 0.0006 in. max TIR per foot.
Straw-Chopper Shafts	1 7/16 in. Round Stress Relieved	C 1045	0.001 in. max TIR per foot. Bars checked before and after machining to prevent excessive vibration. Customer straightens by peening when necessary.
Turned, Ground & Polished Applications			
Pump Shafts	1 to 4½ in. Round	C 1018 C 1040 C 1045	0.0005, 0.0006, and 0.0008 in. respectively max TIR per foot.
Shafting (Textile Machinery)	1 3/16 to 3 15/16 in. Round	C 1040 T & G	0.001/0.002 in. max TIR per foot.
Heat-Treated Alloys	3 & 3½ in. Round	Heat-Treated Alloys	0.0015 in. max TIR per foot.
Fan Shafts	3 3/16 in. Round	C 1040 T & G	0.0011/0.0015 in. max TIR per foot.
Crusher Shafts	4 7/16 in. Round	C 1035	0.0025 in. max TIR per foot to minimize bearing wear.

* NOTE: Where certain applications make higher degrees of straightness necessary, customer straightens to meet requirement.

Standards Needed — What becomes clear is a growing need for standard specifications for straightness. These specs would enable the consumer and the supplier to talk the same terms. The end result would be greater efficiency in joint efforts. The consumer knows his field-service and operational needs better than anyone else. Thus, he has a major role to play.

Now, let's consider a more basic need. It revolves around language or nomenclature. It's surprising that proper terminology hasn't come into use. The sooner this lack is corrected, the better for all concerned.

Proposed first, as a basic (standard) term is: Total Indicator Reading. In reality, TIR is a measure of the degree of "lack of straightness." Thus, it measures deviation from a straight line in a bar.

Simple Setup—In testing, a bar is placed on supporting rolls or lead blocks that are called centers. The inspector rotates the bar against dial indicators and records a total needle travel in thousandths of an inch.

This figure is TIR. Actually, it's twice the bar deviation from a straight line. One half of the center TIR—divided by the distance between centers in feet—equals the average camber per foot.

When a bar has simple curvature or camber the greatest TIR will be found at the bar's center. If the bar has another type of curvature or camber, a different TIR variation will show up. The width of the lead blocks affects the results and can introduce an error. Therefore, this variable must be fixed.

To preserve straightness, utmost care is required every step of the way. Taped ends prevent rubbing and scoring during transportation.

New Fan Conserves Plant Space

Fan designers realize the space-conscious needs of industry.

Modern thinking reduces the fan size but not the capacity.

▪ A new concept in fan design makes it possible for architects, plant engineers and building designers to place air conditioning and fan installations in less than half the space previously required.

Modern trends demand reduced equipment size with no reduction in capacity. This is a big step in that direction. Every cubic foot of installation space saved means another cubic foot that the building owner can use or lease.

Called the Centriline, the fan is a product of Westinghouse Electric Corp's. Sturtevant Div., Boston. It combines the advantages of Airfoil-bladed centrifugal fan performance with the important space-saving features of straight-line air flow.

Saves Floor Space—The new fan is expected to open up new design possibilities by providing the opportunity to use small areas in both commercial and industrial buildings that were formerly considered waste space.

For specifier and installer, this will mean cost reduction and simplicity of erection. The compact design makes it possible to hang the fans from the ceiling, mount them on the wall or stack them one above the other, saving valuable floor space.

The physical size of the new fan ranges up to 50 pct less than conventional scroll-type units. This has been achieved by shaping the housing to provide "straight-through" air flow rather than the conventional right-angle flow.

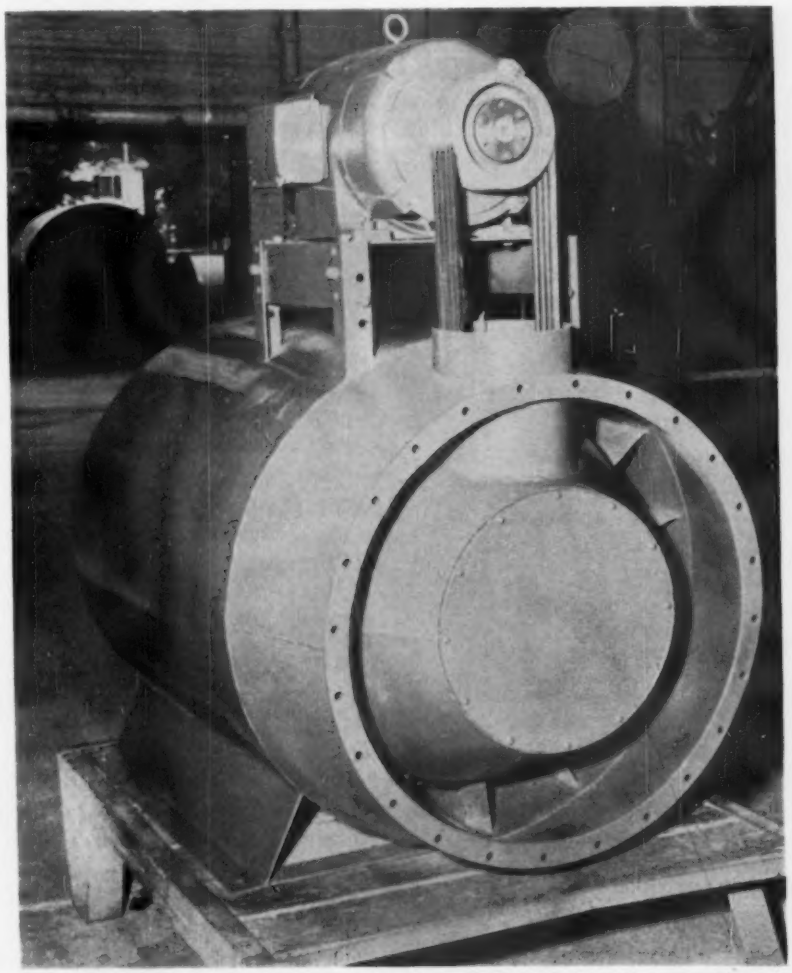
Higher Efficiency—While the exterior shape of the Centriline fan resembles that of an axial fan, it is definitely of the centrifugal type. The high efficiency of the fan is achieved primarily through the use of an Airfoil-bladed centrifugal wheel.

The wheel enables the air to follow the blade contours closely and prevent noise-producing turbulence on the upper blade surfaces. Newly-developed aerodynamic conversion vanes also play an important part in the minimizing of noise—an important element for human comfort in modern-day installations.

The new fan is rated according to the same Air Moving and Conditioning Association (AMCA) classifications as conventional scroll-shaped centrifugal fans. The Centerline fan is made in six sizes, with airfoil wheels from 27-44½ in. in diameter.

Welded Construction—The heavy steel all-welded casing is rigidly braced internally to carry the weight of the largest motors. Motors can be mounted with the base right on the fan housing or mounted separately on an integral vibration base. Both arrangements are V-belt driven.

Volumes range from 4700-46,-800 cfm with pressures up to 9 in. of water static. Installation is made simpler because inlet and outlet dimensions are the same, and one size duct may be used.



COMPACT DESIGN—The centrifugal fan's straightline design makes it possible to hang it from ceilings, mount on walls or stack as needed.

Fire-Prevention Plan Pays Off

Volunteer Firemen Protect Industrial Plant

By **G. E. Driscoll,** Chief, Plant Protection, Worthington Corp., Harrison, N. J.

Fire can create havoc in any large factory. If operations are widespread, protection and prevention problems multiply.

Here's how one company wages a never-ending fight to prevent buildings—and jobs—from going up in a blaze of smoke.

DO-IT-YOURSELF TRUCK: Panel-truck chassis serves as fire engine for 65-acre plant. This compact rig fits in narrow passageways. It plays a major role in a program that's reduced in-plant fires almost 400 pct.

▪ Fire and explosions seldom give any advance warning. They occur unexpectedly and often in the most hard-to-reach areas. An industrial fire-prevention program calls for around-the-clock surveillance, 365 days a year.

To prevent disaster in a large industrial plant, a fire-fighting crew must be ready to battle these cripplers of men and machines on an instant's notice. Fire makes the rules: You have to fight on its own terms.

Key Factors—Speed and experience are a must in waging a successful fight. At the Worthington Corp.'s Harrison plant, volunteer firemen prove a valuable asset. Worthington reports a first-rate fire-prevention program. Why? Because the company has "sold" its program to each employee. Success hinges on employee cooperation.

In 1951, there were 31 alarms in the Harrison plant. Since then, a volunteer fire dept. and a fire-prevention program have been established. As a result, the number of fires has decreased annually. The total for all of 1959 was eight fire alarms. This reflects the effect of a well-planned program.

Worthington's Harrison Works consists of 65 acres. Among the buildings, 99 pct are covered by a sprinkler system. Major buildings include: pattern shops, pattern-storage sheds, and iron, brass and steel foundries.

Just as important are the immense machine and assembly shops, a blacksmith shop, welding lab., welding shop, metallurgy building, power house, acetylene plant, and carpenter and paint shops.

Ready for Trouble—Each building has adequate equipment to combat a small blaze. However, all fires don't start small. Everyone working in the plant is aware that flash fires and explosions can destroy a building in a matter of minutes.

The foundation of a successful program depends upon good housekeeping and the full support of management. Security guards, on their hourly patrols, form the initial line of defense. These men are trained to detect any violations in the fire code.

Each guard inspects all the fire equipment in his assigned area. He checks the sprinkler systems, shut-off valves, hose houses and fire doors. He also watches for any obstructions of fire lanes or fire equipment.

Serious Condition — All violations are reported and the supervisor of the "problem" area is contacted. He's informed of the seriousness of the condition. He knows the hazard must be eliminated as soon as possible.

The supervisor is reminded that fire prevention is everyone's responsibility. No infractions of the fire code will be tolerated.

A proof-of-the-pudding centers on the next move. After a fixed time period, the scene of the viola-

tion is inspected. If the condition hasn't been corrected, drastic measures must be enforced. Infractions can't be tolerated.

The latter case has never cropped up at Worthington. If it ever occurs, management will step into the picture with a firm hand.

Special Precautions—In the pattern shop, special precautions must be employed. Wood shavings and scrap wood leave the building constantly. All through the day the floor stays spotless. Before the employees depart at night a special check is made.

A sprinkler stand-pipe system protects the pattern shops and storage buildings. This system has a 1½-in. hose, attached directly to the sprinkler.

At the Harrison plant, the machine shops are very large. Flammable liquids enter these shops on a day-to-day basis. All of these liquids are transported in safety containers.

Shop personnel use cloth towels. The use of waste is forbidden. When towels are soiled, they're deposited in containers with self-closing lids.

Inspection of overhead cranes and electric motors takes place weekly. Rubbish disposal occurs daily.

Tight Controls—All magnesium-cutting operations are tightly controlled. The machinist uses a sharp tool at all times. Each operator makes sure that all shavings leave the shop. Operators place the shavings in containers with self-closing lids—when they shut off their machines.

Adequate lighting and explosion-proof switches help to protect the paint shop. Vapor-proof globes also insure maximum safety.

Paint drums rest on metal cradles. These cradles are grounded and a self-closing valve is attached to each drum.

Whenever the research dept. conducts tests that require a flammable liquid or gas, they give advance notice. All personnel involved are briefed on the proper precautions that must be taken.

All sections of the welding shop are constructed of concrete and brick. Every bit of production welding takes place in this shop. Welding and burning work in other sections of the plant is kept to a minimum.

Permits Required—A permit is needed, when welding is to take place outside the weld shop. Prior to issuing the permit, an inspector checks the work area for combustible materials. Closing of any sprinkler line also requires a permit.

Throughout the plant, there are 375 fire extinguishers. All are color coded. Color-coded charts show how to use these extinguishers. The charts explain which extinguishers are best for various types of fires.

Extinguishers prove dangerous when they aren't used properly. For dependability, all fire-fighting apparatus must be serviced regularly.

There are 26 hydrants within the plant area. Double-jacket hose is within ready reach of every hydrant. Another 700 ft of hose remains on a small fire engine that's completely equipped to meet the company's first-line fire-fighting needs.

High-Spirited Drills—The volunteer fire department consists of 54 men. These men work in various sections of the plant. Quite a few occupations are represented in the dual-shift crews. In addition, most of the men live within range of the plant's fire whistle.

Drills are held at regular intervals. The men run through these drills at a fast tempo to simulate an actual fire. Each maneuver is timed as teams compete against each other.

Throughout the year, constant practice—and the experience gained at actual fires—hones the edge of this aggressive department. The result is flawless performance.

Drills Keep Firemen Alert

DRILL NUMBER ONE—HOUSEKEEPING

1. Storage and Handling of Flammable Liquids
   - a. vapors
   - b. ventilation
2. Static Electricity
3. Storage of Combustible Materials
   - a. ventilation required
4. Defective Wiring
5. Clearance of Fire Lanes and All Equipment

DRILL NUMBER TWO—CLASSIFICATION OF FIRE

1. Color Code Chart on Extinguishers
2. Extinguishers
   - a. contents of each
   - b. principle of extinguishing agent
3. Maintenance Required
4. Demonstration of Each Type on Actual Fires

DRILL NUMBER THREE—HOSE DRILL

1. Coupling Hose
2. Attaching Nozzles
3. Hydraulics
4. Manning Lines
5. Siamesing Lines
6. Donut Roll
7. Maintenance of Hose

DRILL NUMBER FOUR—LADDER DRILL

1. One-Man Raise
2. Two-Man Raise
3. Proper Spacing from Building
4. Climbing Ladders
5. Lashing Ladder to Buildings
6. Lashing Line to Ladders
7. Proper Ladder Carry
8. Maintenance Required

DRILL NUMBER FIVE—APPARATUS DRILL

1. Skid Load
2. Reverse Lay
3. Straight Lay
4. Attaching Wye
5. Lead Lines
6. Advancing Lines Up Ladders
7. Underarm Carry
8. Rope Drill
9. Axe
10. Pike Pole
11. Gas Mask Drill

DRILL NUMBER SIX—FLASH FIRES

1. Safety Precautions To Be Taken
2. Spontaneous Ignition
   - a. combination of materials that may cause it
3. Smoke Explosions and Back Draft
   - a. proper way to ventilate
   - b. safety precautions to be taken
4. Sprinkler Systems

How to Choose the Right Joint In Shaft-to-Plate Unions

By **Federico Strasser,** Consultant, Santiago, Chile

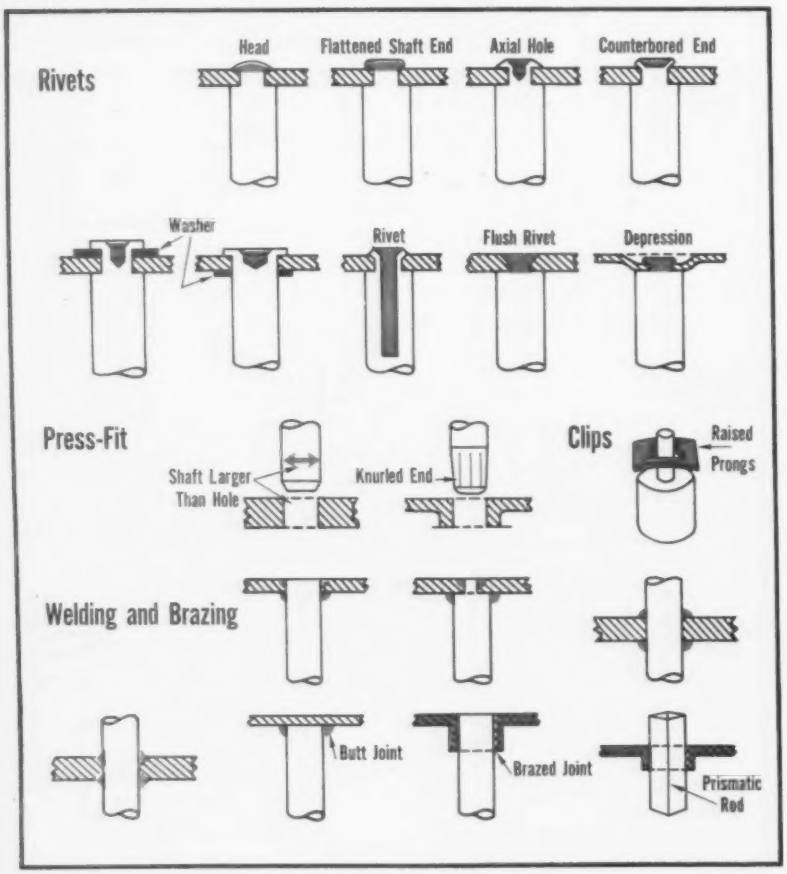
You have a wide choice of fabricating techniques when attaching bars and shafts to sheet metal or plate.

The more you know about these methods, the more chance of success.

▪ It's almost impossible for a metalworking shop to get through the day without facing the task of attaching a bar to sheet metal or plate. How you go about it depends on many factors. Is your union to be temporary or permanent? What strength is required? How thick is the sheet or plate?

To make a permanent union, you have five methods from which to choose. They are riveting, staking, press-fitting, clipping and welding. Temporary joints can be formed by threaded parts, dowel pins or split rings. Each method offers many designs. The user can find one combination to meet his current needs.

Strength Makes Joints Last



In riveting, the most common method consists of reducing the end of the bar, then introducing it into a snug fitting hole in the sheet metal. The operation is completed by driving a rivet over the free end. If the shape of the rivet head is immaterial, you can just flatten out the free end of the shaft.

You can ease riveting by making an axial hole in the shaft end. When confronted with larger diameters, you should counterbore the shaft end.

Weak Metal—What do you do when the flat part is made from a weak material? That's when a metal washer comes in handy. It should be placed between the rivet head and the stamping. Suppose there's little difference between diameters of the shaft and the bar? Once again a washer should be used—this time under the stamping.

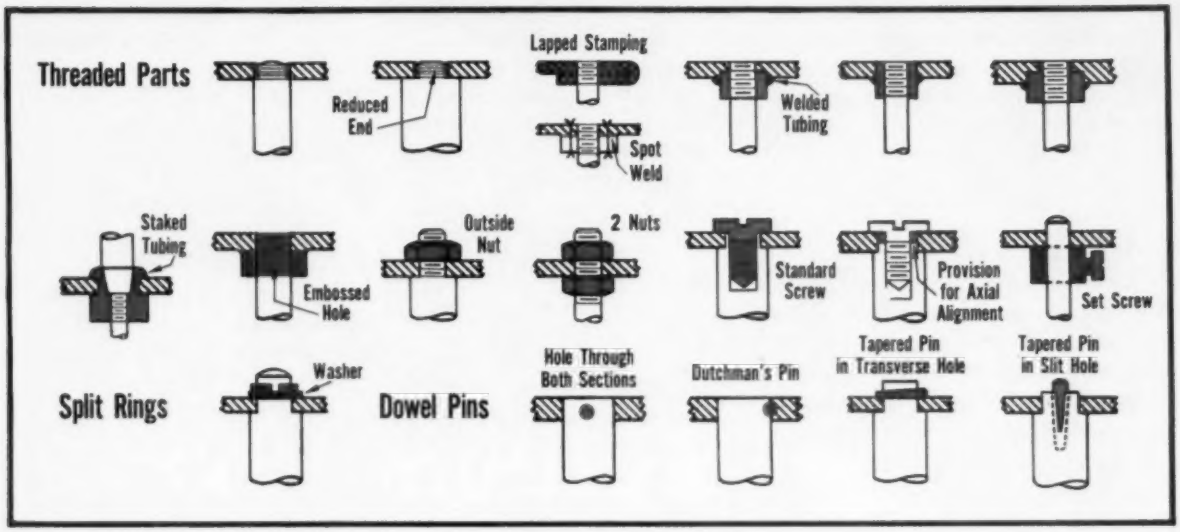
If strength isn't too important, you can make your shaft hollow, making riveting much easier.

Design factors often call for a rivet head to mount flush with the surface of the sheet metal part. In such an instance, counterboring is required. What do you do if the sheet metal section is too thin for counterboring? A depression should be made to provide the cavity needed.

Staking Techniques—Staking will master many joining problems, especially in jobs that exert limited loads. Usually, the metal around the hole is squeezed inwards. At times, however, the reverse is acceptable: spreading the shaft out.

The bar end must not always be flush with the outer surface of the

Why Temporary Unions Are Re-Usable



sheet metal. The shaft may extend beyond the surface. Such an extension is sometimes—partly or totally—hollow.

Staking can be done with straight bars instead of bars with reduced end portions. In these cases, however, staking should be made from both sides of the sheet metal. This adds strength. When you have to spread the bar outward, you'll also need a flange at the joining zone.

Crimping Action—Suppose there's an embossed hole within the sheet metal. Then a groove is turned in the bar and the metal of the boss crimped into the groove.

Staking isn't always done on the whole periphery of the joining zone between the two parts. This is especially true whenever the flat part is weak and low joint strength is needed. Use a chisel-type tool at strategic points. This approach provides quite a few staking patterns.

In the event that a staked union must be prevented from turning radially, several avenues are open. A grooved hole is one method. When the opportunity presents itself, try to match the shape of the hole with the shape of the shaft. Of course, such methods are costly, but they are sure cures against radial turning.

Counterboring — Another approach must be taken in handling soft sheet metal. First, make a counterbored hole. Then connect the reduced shaft end to the bar body with a tapered portion. The latter will offer better gripping action if it is knurled.

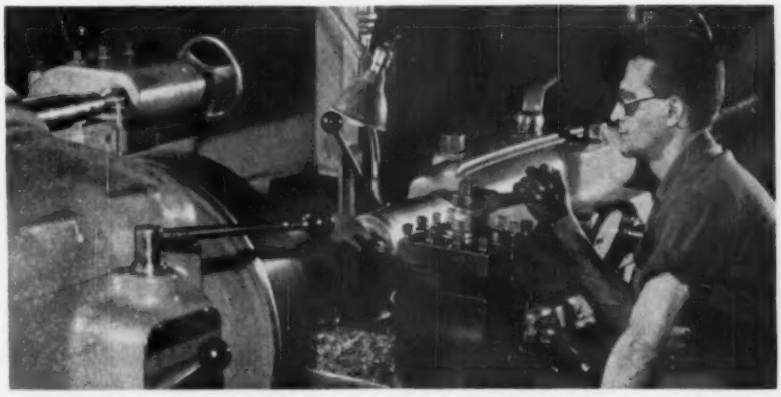
The best way to prevent out-of-round bars from turning is to place a hold on the bar body itself. This can be handled in several ways. One is to provide an extra plate with a proper matching hole for the press body.

You can also make a matching depression in the stamping. A third method is to fold over the sheet metal stamping after a properly-shaped and correctly-located hole has been opened in it.

Press Fit—In a press fit, you can make the sheet metal hole slightly smaller than the shaft diameter. Then force the shaft into the hole. You can make the same union even stronger by embossing the hole length. Added strength can be obtained by knurling the shaft end.

For very light duty, "speed nut" clips may be used. They are placed on the protruding shaft and simply flattened.

Three joints are available for welding. The first requires the rod to be inserted in a matching hole in the stamping. If the rod extends through the stamping, you get two



MACHINING THE END: Very often, the joining technique used requires the ends of shafts or bars be reduced through machining methods.

weld zones and greater strength, too. For light duty, you can just weld the shaft to the stamping in a regular butt joint design.

In brazing, it's best to provide embossed holes in the sheet metal parts. When you're dealing with prismatic rods, such holes aren't practical. Double lancing should be used instead.

Thread the Shaft—If your aim is temporary assembly, threaded parts deserve a close look. The simplest form is the threaded shaft that fits into a tapped hole within the sheet metal. Larger diameter rods are usually reduced.

When the sheet metal is too thin to be tapped, thickness can be increased by either bending over the end of the stamping, spot welding a piece of sheet metal or fastening tubing to the part by welding or riveting. You can also emboss the hole.

What is the best way to avoid tapping? First, you can reduce the shaft end, then thread it. You can introduce it in a straight hole in the stamping and tighten the rod with a nut. With small rods, they can be threaded without reducing the shaft. Place a nut on each side to lock the bar in place.

Axial Holes—You also tap an axial hole in the rod end. Insert a standard screw through the clearance hole. If axial alignment is needed between the rod and the sheet metal, then reduce the bar end to a size that matches the hole in the flat metal. If you have enough space in the sheet metal's boss, use a set screw to hold the rod in place.

Where do you use dowel pins? There are four common uses. First, dowel pins can be used through the center of both the rod and sheet metal. They can be used as Dutchman's pins, tangential to both the rod end and the hole periphery in the sheet metal part.

Tapered pins fill the bill in thin sheet metal parts. You can also make an axial hole in the reduced bar end, then slit it longitudinally. Introduce this into the sheet metal and drive a tapered pin into the rod and hole.

Split rings, put in the proper grooves in the protruding ends of the reduced rod ends, hold entire assemblies in place.

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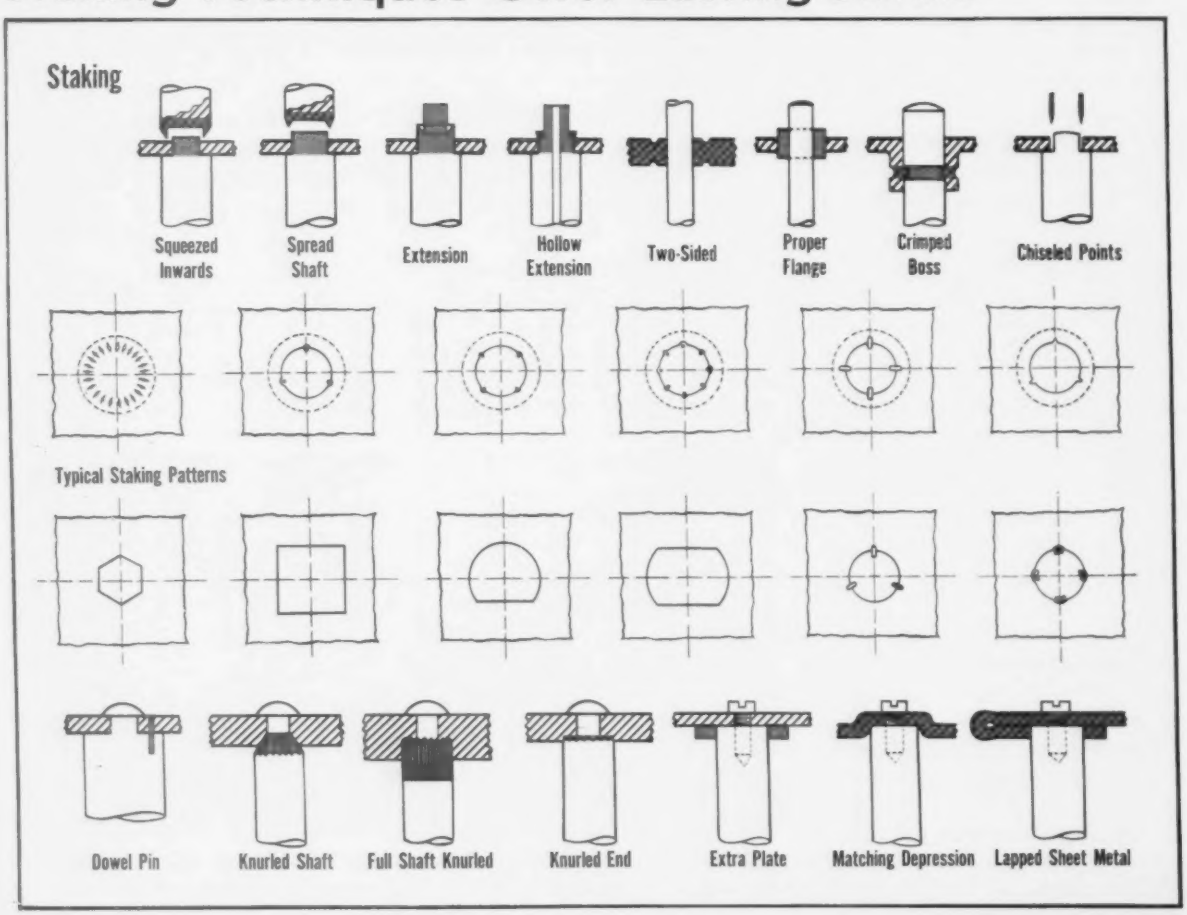
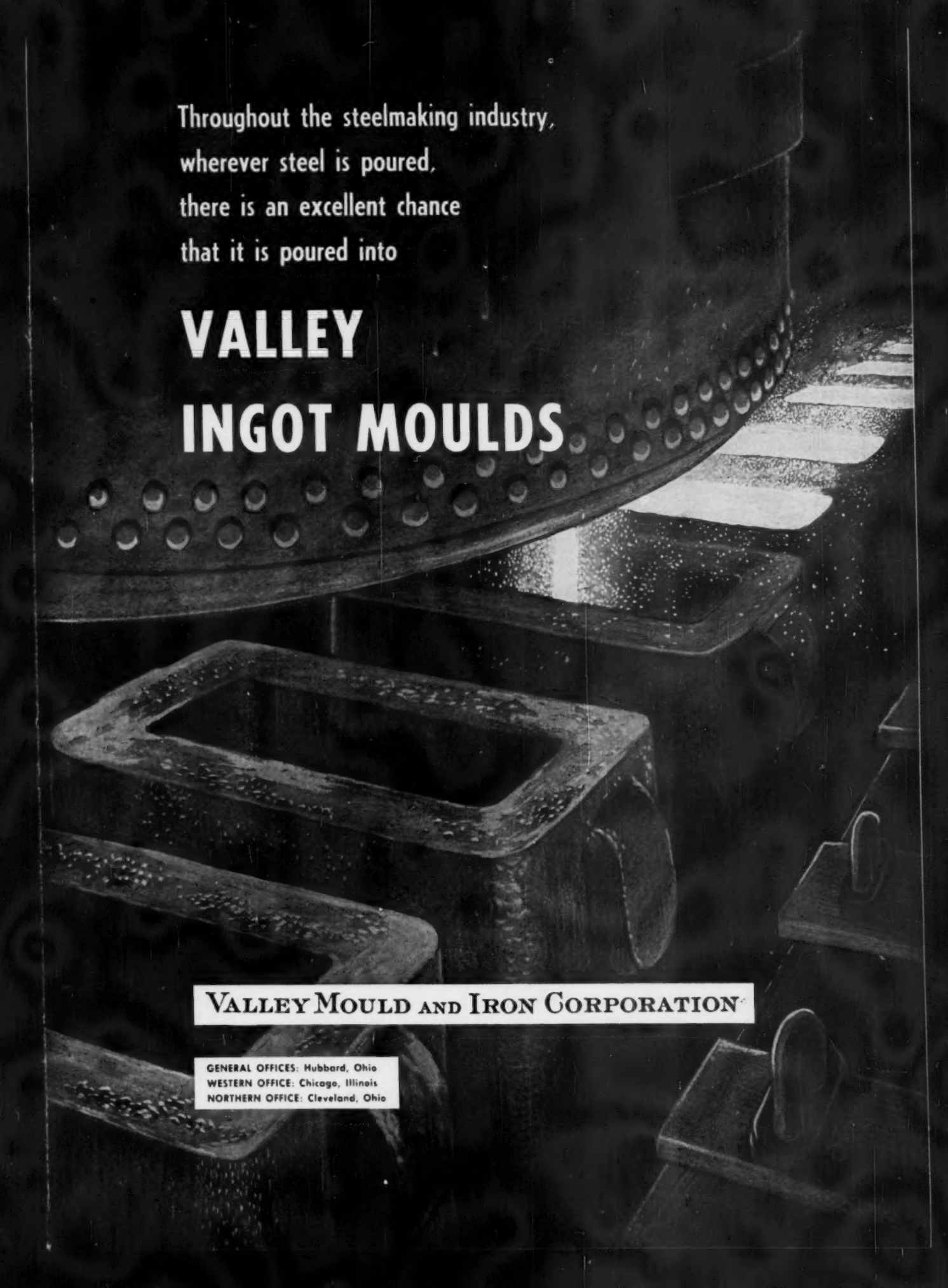
Staking Techniques Offer Lasting Joints

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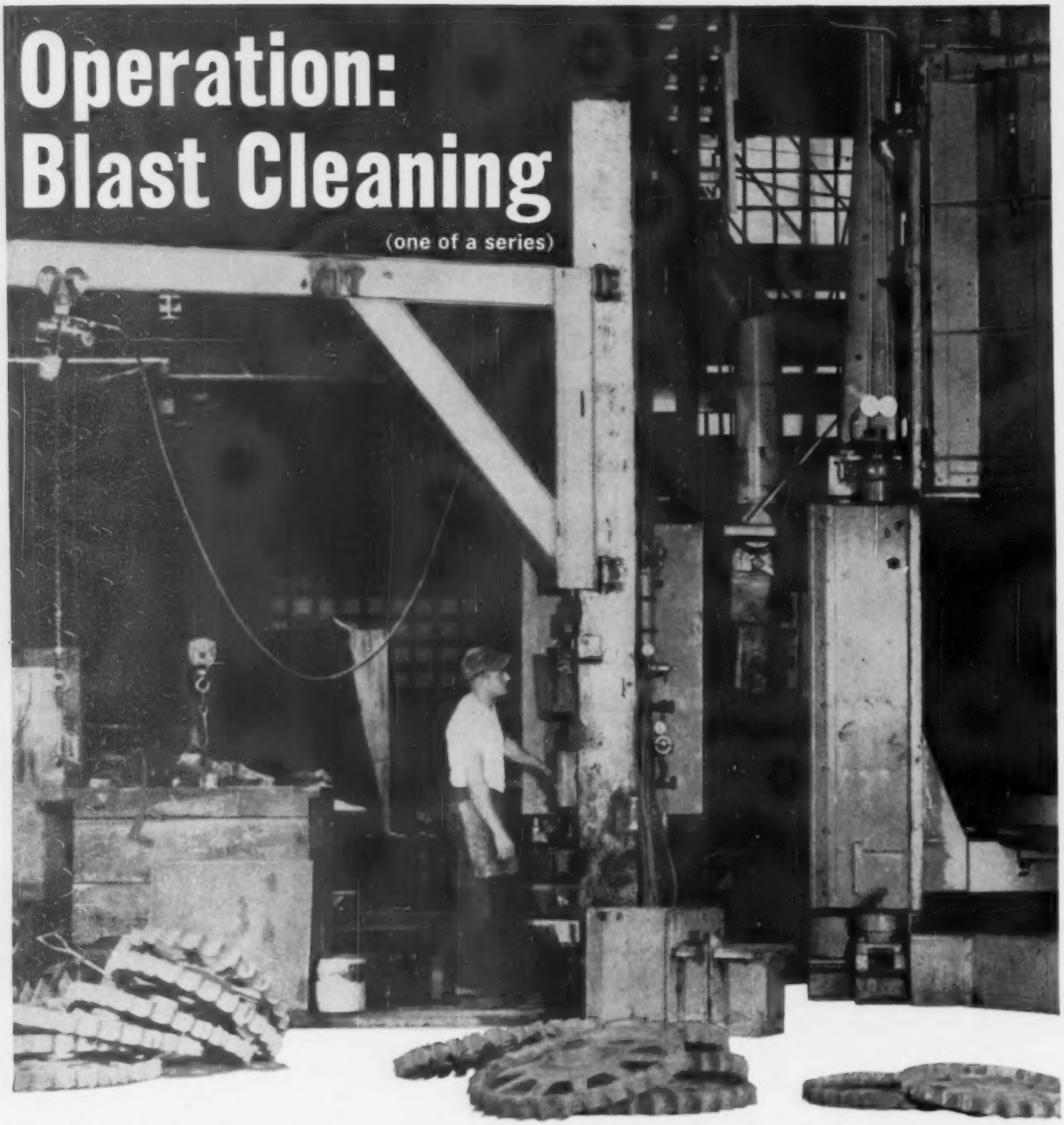


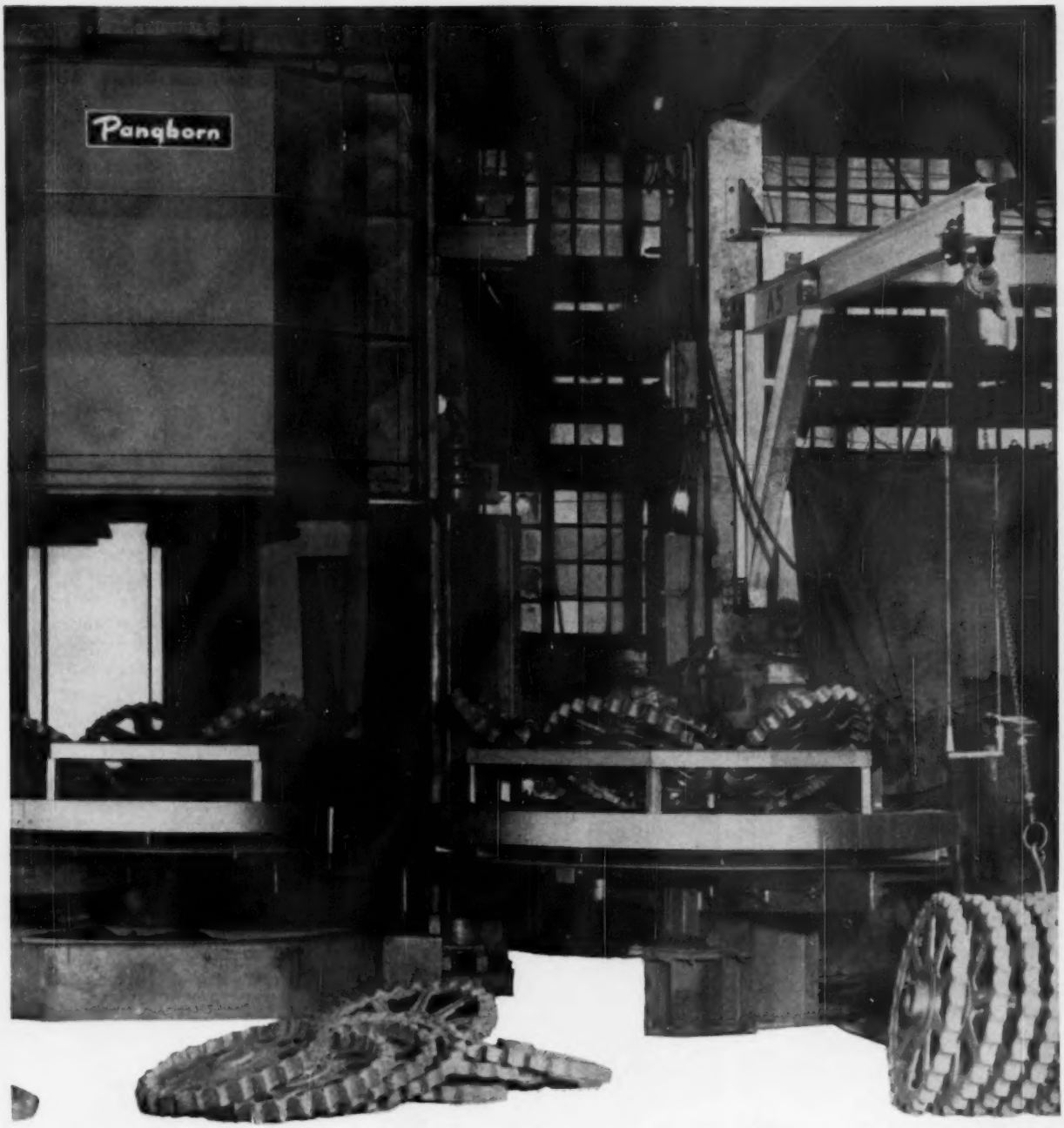
Twin-table Rotoblast hurls 50 tons of

Here's why the Pangborn Rotoblast "LM" Table Room doubled the capacity of the cleaning department at Harrison Steel Castings Co., Attica, Ind.

Inside the "LM" Table Room two Rotoblast Wheels throw 100,000 lbs. of abrasive at the castings every hour. This is blast power at its best. The abrasive hurled in a pattern designed to clean thoroughly every spot on every casting, even on bulky pieces up to 8′ in diameter.

During the cleaning process, castings rest on a rotating work table which increases the efficiency of the blast pattern. While one table is in the machine, its twin is being loaded outside. This makes for quick, continuous operation.

The tables are accessible from all sides (an exclusive Pangborn feature). They handle easily and can be pushed by hand with little effort. In the loading process, their weight is supported by a stationary



shot per hour... cleans twice as fast!

floor pedestal—rather than door hinges—for long life and trouble-free operation.

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New Patents In Metalworking

Steel Contains Lead

Method of making lead-containing steels, M. Tenenbaum, J. W. Halley and F. W. Luerssen (assigned to Inland Steel Co., Chicago), Aug. 2, 1960. In the production of a steel containing 0.03-0.5 pct lead, a stream of molten steel is fed to molten lead. The molten material is separated into two layers by gravity settling. The upper layer, comprising steel containing a small amount of lead dispersed therein, is removed and solidified. No. 2,947,622.

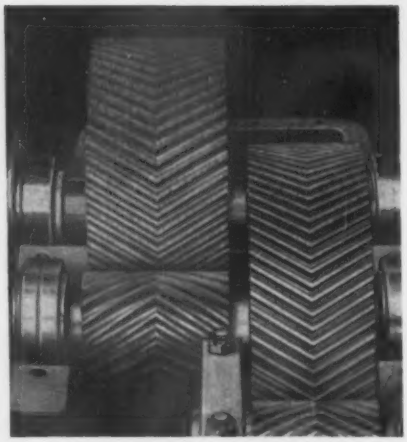
Iron Ore Briquettes

Briquetting roll, E. H. Shipley (assigned to U. S. Steel Corp., Pittsburgh), Aug. 23, 1960. Design for an improved roll for briquetting iron ore fines. The side walls of the cavities, which are subjected to the most wear, are formed of removable and replaceable inserts fixed within slots in the roll body. No. 2,949,-634.

Nickel-Free Alloy

Nickel-free austenitic elevated temperature alloy, R. K. Pitler and W. E. Blatz (assigned to Allegheny Ludlum Steel Corp., Brackenridge, Pa.), Aug. 9, 1960. An austenitic precipitation hardening nickel-free alloy can be used at temperatures up to about 1500°F. It comprises 0.5-1 pct C, 7-14 pct Mn, 12-18 pct Cr, 1.5-6 pct Mo, 0.5-2 pct V, 0.4-3.5 pct Cb plus Ta, 0.2-0.5 pct N, 1-4 pct Cu, and the balance Fe and incidental impurities. No. 2,-948,603.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.



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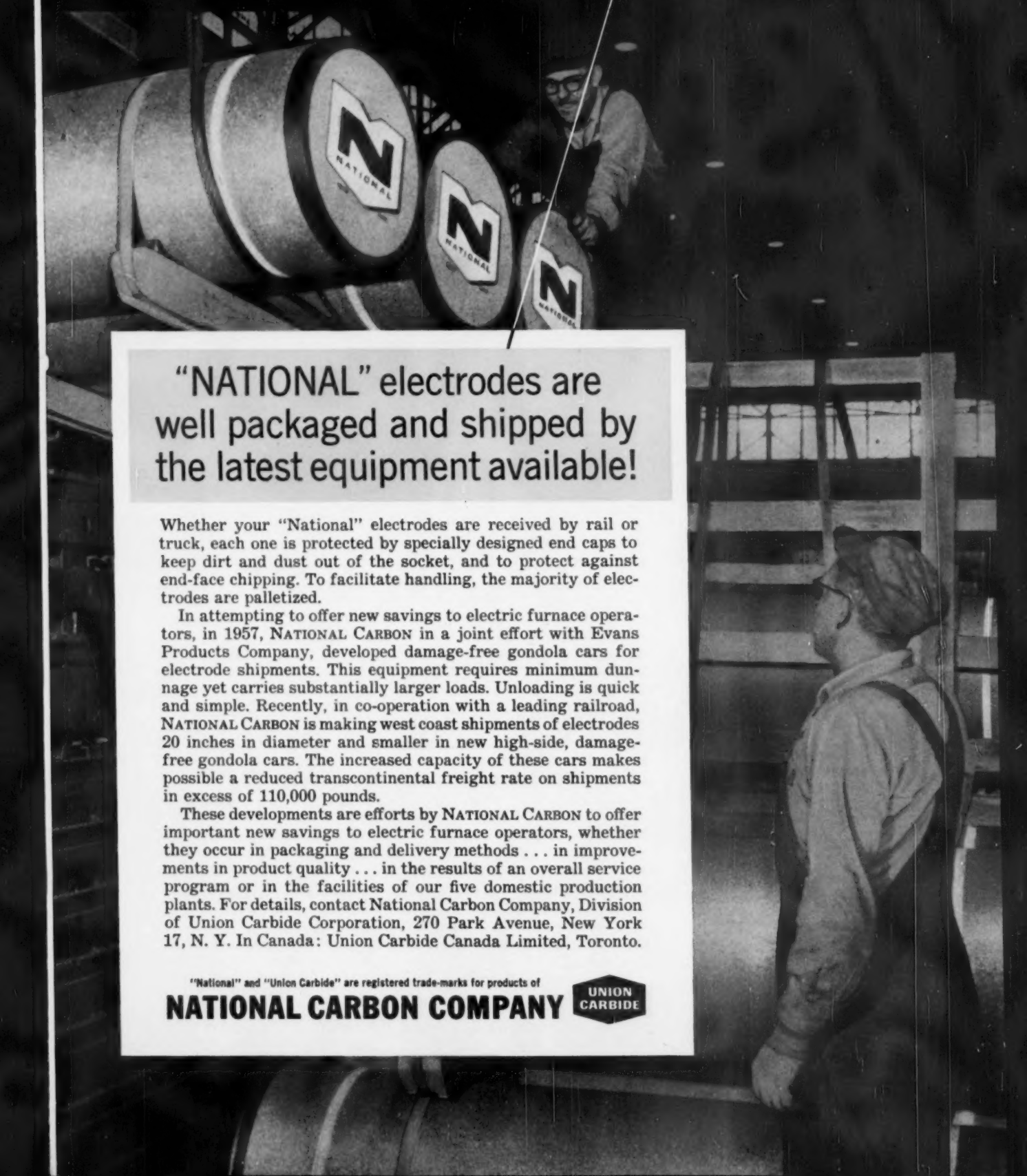

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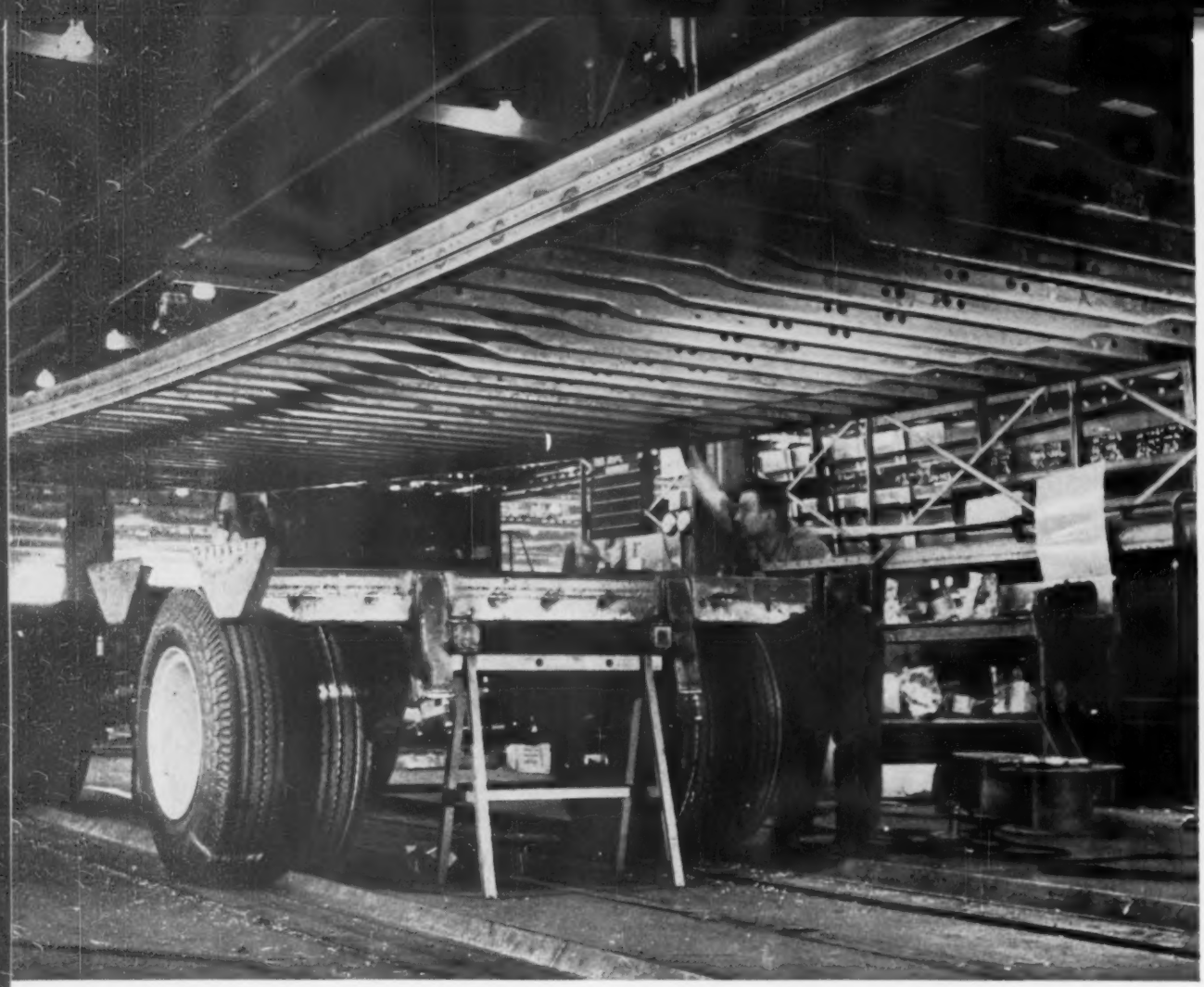


At Fruehauf Trailers' huge Avon Lake, Ohio, plant, crossmembers made from PITT-TEN high strength structural sheet provide 22 percent more payload.

Here, on the assembly line, a Fruehauf trailer bed made with Pittsburgh Steel Co. PITT-TEN is swung onto the underconstruction assembly.

As Trailer Bed Crossmembers

Fruehauf Gets 22% More Payload With Pittsburgh Steel's New PITT-TEN

Twenty-two percent more payload—that's what Fruehauf is building into the framework of giant trailers assembled with crossmembers made of PITT-TEN, Pittsburgh Steel Company's new high strength structural sheet.

Fruehauf uses PITT-TEN #1 at its Avon Lake, Ohio, plant—the largest trailer manufacturing facility in the world—because it offers a combination of benefits that . . .

- **Cuts deadweight with no loss of strength**
- **Lengthens service life through superior corrosion resistance**

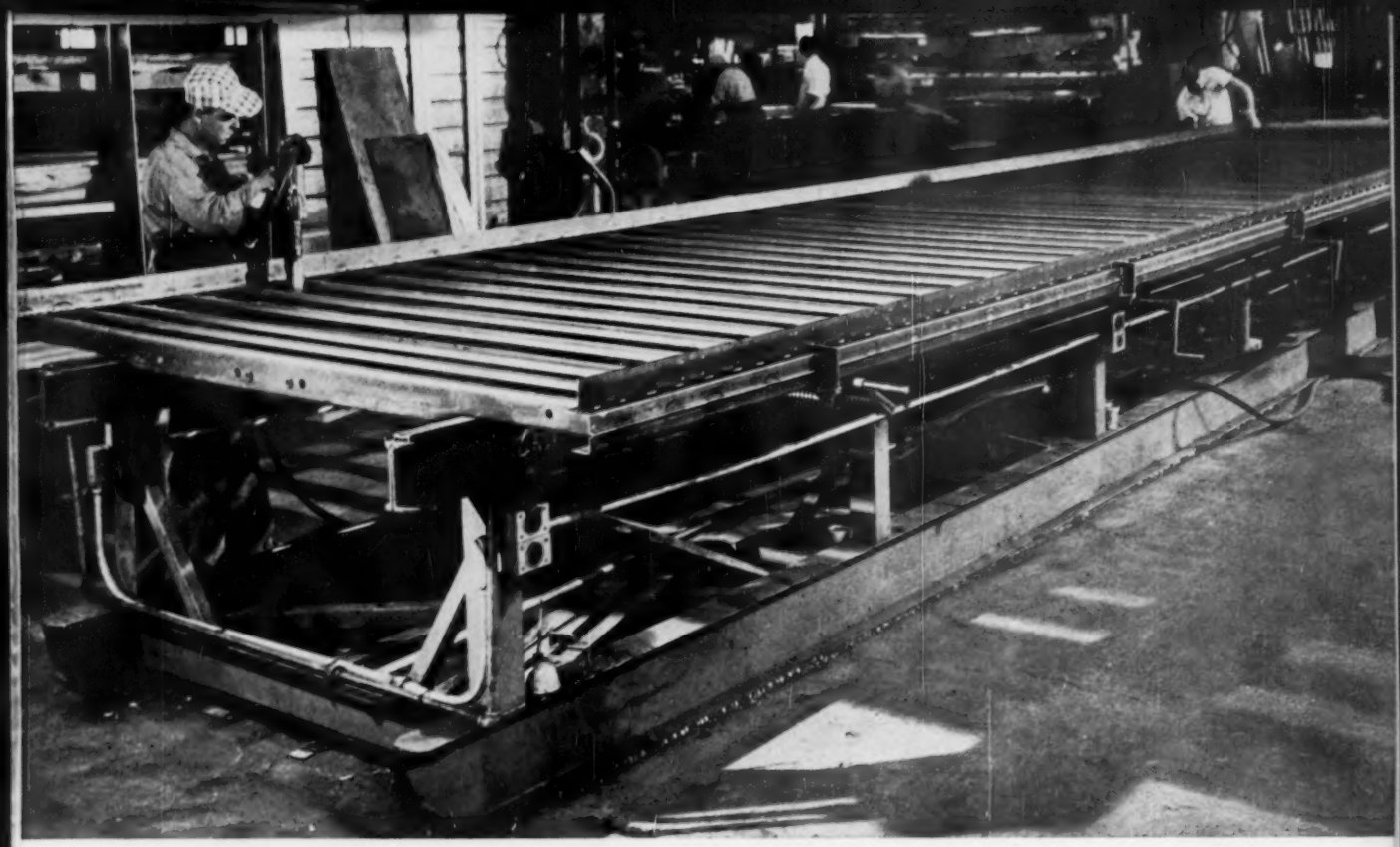
• **Light Yet Strong** — Fruehauf tries to make its trailers as light as possible with no sacrifice in strength. Trailer bed crossmembers made of high strength PITT-TEN are lighter, for equal strength, than mild steel.

The weight saving amounts to more than eight pounds for each piece. That's because three pounds of PITT-TEN do the work of nearly four pounds of ordinary sheet steel. At the same time, it provides all the strength needed for years of hard use.

Corrosion resistance is another problem in trailer operation. Fruehauf trailers are used under all types of conditions that could create maintenance headaches if the proper material were not used.

PITT-TEN #1 has four to six times the resistance of carbon steel to atmospheric corrosion. So, Fruehauf specifies PITT-TEN to reduce maintenance costs.

The trailer part basically is a channel 93⅛ inches long, 2 inches deep and 3 inches wide. Its width is expanded to 4½ inches on one side by an offset that extends most of its length. In addition, a ¾-inch



During assembly of Fruehauf trailer bed, cross-members made from high strength structural PITT-TEN are riveted to the side rail. PITT-TEN #1 reduces maintenance requirements of Fruehauf trailers through superior corrosion resistance. It has four to six times the corrosion resistance of carbon steel to atmospheric corrosion. PITT-TEN also cuts deadweight with no loss in strength.

return flange is applied full length to both edges.

Fruehauf engineers point out that forming this piece with offset and flange in high tensile steel would be a tricky business without consistent quality — and with PITT-TEN Fruehauf has a steel that does the job.

PITTSBURGH STEEL NEW SOURCE–This is one of several applications which mark the entry of Pittsburgh Steel in the high strength steel market, one of the fastest growing in metalworking.

That means this:

Fabricators of high strength steel structurals—or any product where the weight/strength ratio is a factor—now have a new source of supply.

In the eight years Pittsburgh Steel has been producing flat-rolled products, it has become recognized for the unexcelled quality of its steel sheet and strip. Now PITT-TEN is being produced by the same fine steelmaking and steel rolling facilities which have earned that reputation for quality.

PITT-TEN is produced in three grades, each with specific physical properties. Briefly, here they are:

PITT-TEN #1—An all-around high strength structural sheet that offers a combination of benefits. First is greater strength without increased weight; or equal strength with a lighter section. Second is longer product life, less maintenance through greater resistance to corrosion (four to six times that of mild carbon steel.)

PITT-TEN #2—high strength sheet with exceptional formability. This grade is produced to tensile and yield requirements to meet forming problems of specific fabricated parts.

PITT-TEN "X"—produced to guaranteed minimum yield points of 45,000 and 50,000 psi. This grade is especially useful where the controlling factor is a reduction in weight without loss of strength.

If your product's success depends on weight/strength factors, then Pittsburgh Steel's new PITT-TEN can benefit you, too.

Let one of our service metallurgists show you how. They're as familiar with steel fabricating problems as they are with steelmaking problems. Just contact one of the sales offices listed here.

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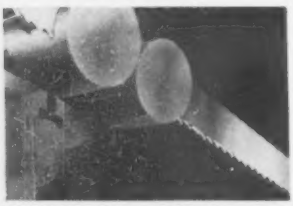
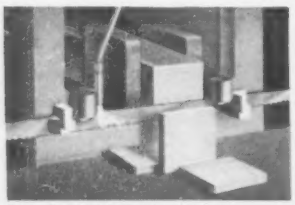


SUPER High Speed Steel . . . an entirely new concept in band saws, this super blade will give up to 3 times better performance than any other high speed steel blade.



Standard High Speed Steel . . . a tool of highest quality, designed for faster cutting and longer life than conventional metal cutting band saw blades.

Hard Edge Carbon Steel . . . a top quality blade well known for its versatility. Furnished in all standard widths and tooth styles for contour or cut-off work.

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(LOCAL SKILL — LOCAL STOCKS — LOCAL SPEED)

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Back of the "controlled conditions" quality of every Simonds cutting tool is the "Triple-S-Service" of your local Simonds Distributor. He not only *stocks* and services your account with local *speed*, but provides a local source of technical *skill* and know-how.

As your local Simonds Distributor, he is thoroughly schooled in the proper application and use of Simonds cutting tools. And can help you *perfectioneer* your toughest wood or metal cutting jobs.

For the best combination of quality cutting tools and on-the-spot service that saves you time, work and money — use the "Triple-S-Service" of your local Simonds Distributor.

Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Ore. • Canadian Factory in Granby, Que. • Simonds Divisions: Simonds Steel Mill, Lockport, New York; Heller Tool Co., Newcomerstown, Ohio; Simonds Abrasive Co., Philadelphia, Pa. and Arvida, Que., Canada

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASSACHUSETTS

INDUSTRIAL DISTRIBUTORS · RIGHT HAND OF PRODUCTION

Get your local Simonds Distributor's "TRIPLE-S-SERVICE" — For Local Stocks — Local Speed — Local Skill

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Space-Saving Fans

Discussed in a 14-page catalog is an airfoil centrifugal fan. The fan has in-line air flow. Well illustrated with photographs, the booklet also supplies construction and installation diagrams, performance curves and tables. (Westinghouse Electric Corp.)

For free copy circle No. 1 on postcard

Hydraulic Equipment

Information on industrial, hydraulic equipment fills a catalog. Descriptions and performance data accompany each piece of equipment. The equipment includes pumps, valves and motors. (Zeno Hydraulic Corp.)

For free copy circle No. 2 on postcard

Foundry Core Binders

The use of a baked strength core binder, in combination with core oils, is described in a two-color folder. The text explains how core oil can be added to the dry binder, to regulate the drying speed and prevent overbake of small cores. (Corn Products Sales Co.)

For free copy circle No. 3 on postcard

Microscopes

An eight-page booklet concerns itself with metallurgical microscopes. Various models are pictured and described. (Elgeet Optical Co., Inc.)

For free copy circle No. 4 on postcard

Colored Stainless

Color-coated stainless steel is illustrated in an eight-page bulletin. It gives general information, characteristics, physical and mechanical properties. Also included are uses for the color-coated stainless steel sheet and strip. A separate color card shows complete color range. (Washington Steel Corp.)

For free copy circle No. 5 on postcard

Temperature Control

A bulletin describes a differential, expansion-type pneumatic temperature control. Included are photographs, description of operation and table of standard ranges, tube size and performance. (Burling Instrument Co.)

For free copy circle No. 6 on postcard

Business Machines

A 28-page booklet covers a dozen major data - processing systems which are controlled automatically by the company's business machines. (Friden, Inc.)

For free copy circle No. 7 on postcard

Portable Nibbler

Containing data on a portable nibbler, a bulletin presents a description, a photograph, and specifications on the device. The heavy-duty nibbler cuts through ¼-in. cold or hot rolled steel. (Fenway Machine Co., Inc.)

For free copy circle No. 8 on postcard

Roll Grinding Wheels

A four-page brochure on roll grinding wheels describes the desired wheel characteristics required for all types of modern roll grinding. This also includes good balance, fast cutting action and rapid stock removal. Included are photographs of various types of roll grinding wheels. (Macklin Co.)

For free copy circle No. 9 on postcard

Furnace Transformers

Well illustrated, a 16-page descriptive booklet deals with electric furnace transformers. The booklet includes a review of the basic design principles applied to transformers with high-current ratings.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **10/27/60**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

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71	72	73	74	75	76	77	78	79	80
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PERMIT No. 36
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BUSINESS REPLY MAIL
No postage necessary if mailed in the United States

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THE IRON AGE
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71	72	73	74	75	76	77	78	79	80
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FREE LITERATURE

Also included are construction details and principle accessories. Internal and external features are illustrated by photographs and drawings. (For free copy, write on company letterhead to McGraw-Edison Co., Box 330, Canonsburg, Pa.)

High-Strength Bronzes

Specifications of nine special wear- and corrosion-resistant alloys are described in a bulletin. The 20-page bulletin includes chemical compositions, physical properties and principle uses of a series of copper-base alloys. (Ampco Metal, Inc.)

For free copy circle No. 10 on postcard

Grinding Tools

Complete details on portable, precision grinding tools and small-hole drilling equipment are given in a 36-page catalog. It includes all specifications, sizes, capacities and suggested uses. (The Dumore Co.)

For free copy circle No. 11 on postcard

Press Brakes

Concerned with straight-side-type press brakes, a bulletin describes the principal construction features. It also gives the general specifications. Included are a number of large illustrations showing the general application of the large die area on this type of press brake. (Dreis & Krump Mfg. Co.)

For free copy circle No. 12 on postcard

Detects Water in Tanks

The installation and operation of a water sentinel is described in a bulletin. The sentinel is a device that detects water in enclosed-type oil quench tanks. (Ipsen Industries, Inc.)

For free copy circle No. 13 on postcard

Air Tools

Air tools, power motors and accessories are described in detail in a 96-page catalog. The catalog features convenient grouping of the contents in nine sections. (Aro Equipment Corp.)

For free copy circle No. 14 on postcard

Ore Ball Mill

A process application sheet describes the operation of an ore ball mill and classifier control. A basic diagram of a control system is included to illustrate how application of the system increases grinding efficiency, improves metal recovery, decreases variation in flow to flotation, controls grate of concentrate. (Bailey Meter Co.)

For free copy circle No. 15 on postcard

Industrial Ceramics

Ceramic parts, made by the manufacturer, are discussed in a brief folder. Photographs, along with descriptions, relate part manufacture and applications of the part. Also listed in the folder, are mechanical and electrical properties of the ceramics (Coors Porcelain Co.)

For free copy circle No. 16 on postcard

Circular Switches

A circular features an adjustable pulse switch, center neutral limit switch and proximity switch. Illustrated are a wide variety of switches for use on machine tools and other industrial equipment. (Micro Switch)

For free copy circle No. 17 on postcard

Indented Marking

Consisting of 37 pages, a catalog contains a complete line of machines and tools for permanently indented marking. The catalog is sectionalized for quick reference on roll marking, press stamping, hand stamping, graduating, marking dies and tools. (Noble & Westbrook Mfg. Co.)

For free copy circle No. 18 on postcard

Turret Lathe

Illustrated and described in a four-page folder is a turret lathe. Close up illustrations show the many new features of the lathe. The bulletin contains complete specifications and dimensional data for tooling. (Sheldon Machine Co.)

For free copy circle No. 19 on postcard

Microstoning Machines

Complete information on all of the manufacturer's microstoning equipment is given in a 15-page catalog. It explains the advantages of microstoning. Attachments are also listed. (Taft-Peirce Mfg. Co.)

For free copy circle No. 20 on postcard

Stainless Electrodes

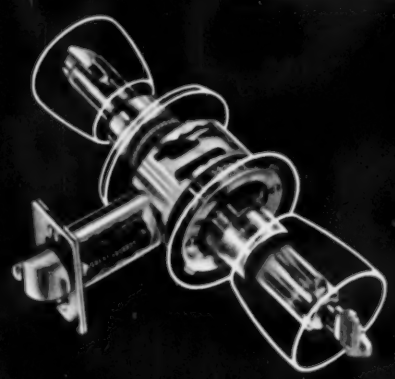
Valuable and handy, a chart on chemical and physical specifications on stainless steel electrodes is supplied in a six-page folder. The chart lists the grade of steel, AWS and AISI specifications, principle properties as welded and other information. (The McKay Co.)

For free copy circle No. 21 on postcard

Extra years of fine lock service

-thanks to Superior Stainless

STRIP STEEL



Inside Schlage's all stainless lock; easy-working for a lifetime with Superior Stainless non-corrodible knobs, rose and internal mechanism.

The finest lock of its kind in the world, this pride of the Schlage Lock Company is built entirely of stainless steel—outside and in. Designed for institutional, commercial and marine use, it will deliver many years of faithful service undimmed by corrosion, tarnish, chipping or peeling because it's *solid* Superior Stainless . . . the stay-bright, easy-to-fabricate metal for your toughest applications. • Find out how Superior Stainless Strip Steel can better your present products and the ones to come. Consult a Superior sales engineer for facts you can use right now!

SUPERIOR STEEL DIVISION

OF

COPPERWELD STEEL COMPANY

CARNEGIE, PENNSYLVANIA

For Export: Copperweld Steel International Company, New York

Stainless Steel

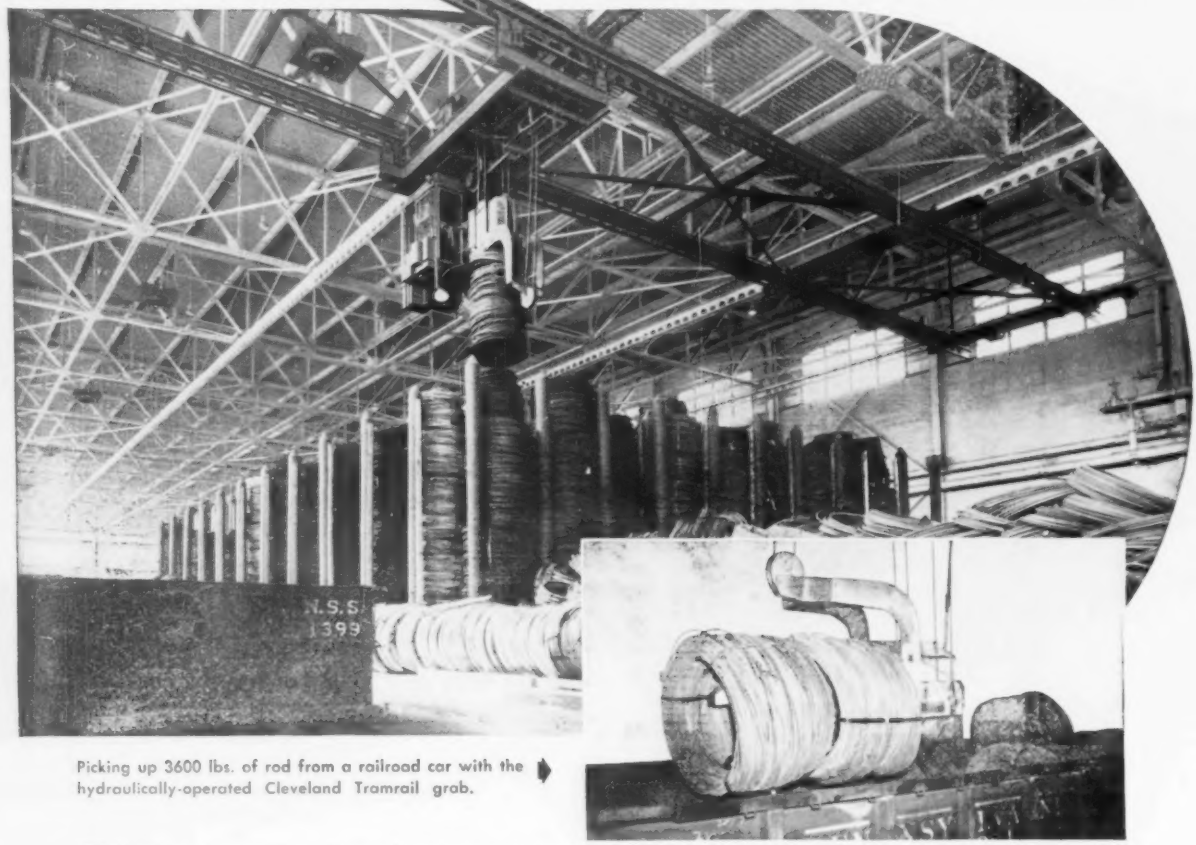
FOR REAL COIL SELECTIVITY

CONSIDER THIS SYSTEM

Any Coil In Hundreds of Varieties QUICKLY REACHED

2190 tons of rod can be stored vertically in this 5000 sq. ft. storage and any variety can be withdrawn immediately.

The 98'-0" span cab-operated Cleveland Tramrail crane has 5 tons capacity, is of double-girder construction and operates on four overhead tracks.



Picking up 3600 lbs. of rod from a railroad car with the hydraulically-operated Cleveland Tramrail grab.

SOME mighty outstanding advantages are provided in the rod storage at the modern plant of The Cleveland Cap Screw Co., Cleveland, by a Cleveland Tramrail vertical storage system which includes an overhead cab-operated crane and hydraulically-operated hairpin hook.

The system enables storing a great variety of sizes, heats and alloys in piles to heights of 17 feet and permits immediate access to any item without handling or disturbing others. Complete inventory can be maintained by the operator from his crane cab.

That is not all. The system has boosted efficiency tremendously by greatly reducing the man-hours of time required per ton. The crane operator alone takes care of the whole storage job. This includes picking coils from incoming railroad cars, placing into storage and removing from storage for delivery to production departments.

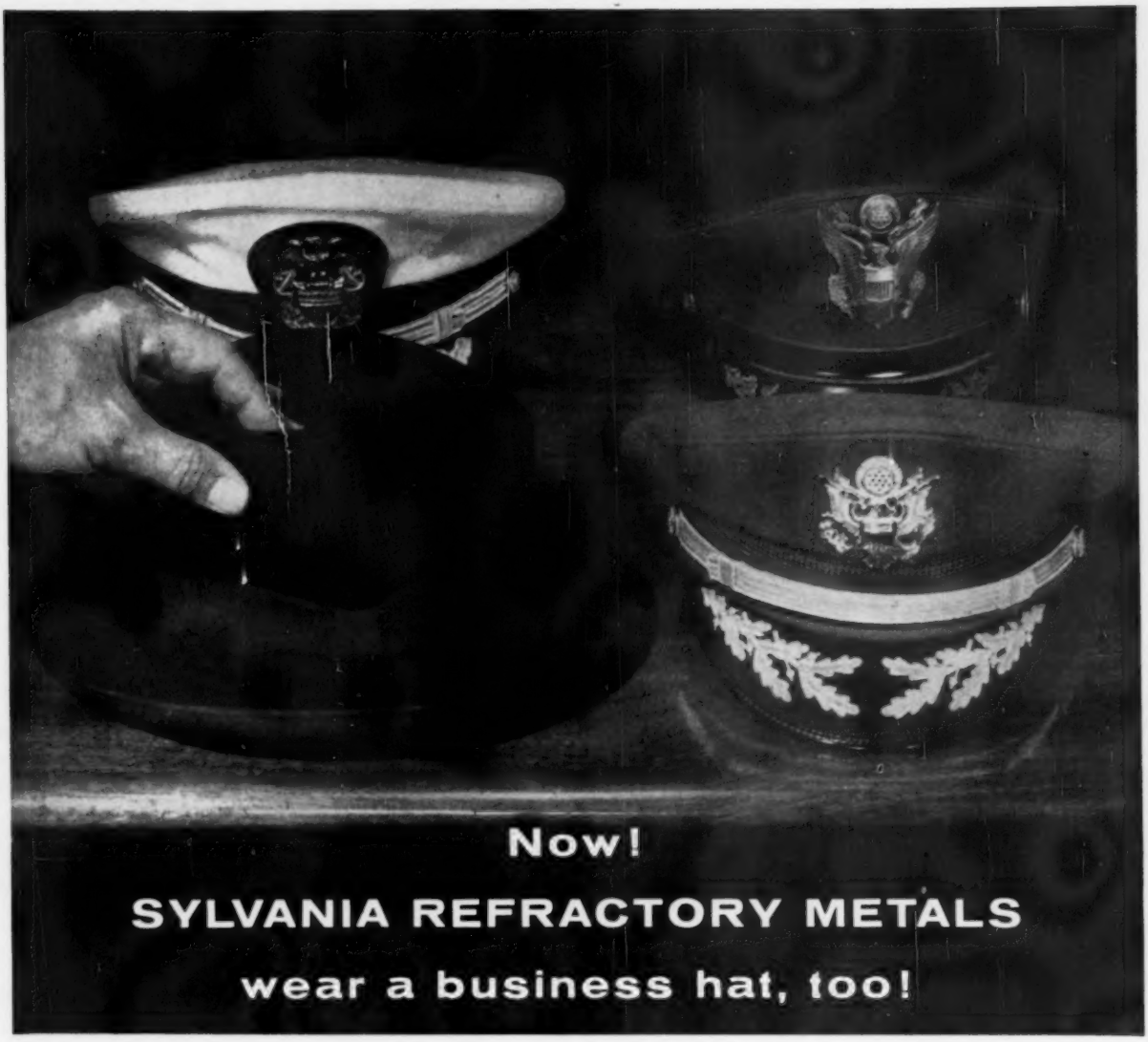
Get the facts on this most modern of all wire and rod storage methods.

"Ask for free copy of Booklet No. 2008"

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4827 E. 288 ST. • WICKLIFFE, OHIO



The same top-quality Sylvania tungsten and molybdenum used for government and military projects are now opening up new avenues of applications to all industry!

These metals, able to withstand extremely high temperatures, can be specified in both large- and small-sized billets for arc casting and forging. Or if specifications require, they may simply be machined down to final tolerances.

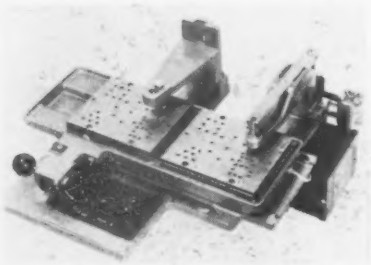
You can use these metals in an almost endless number of ways. Some of the potential applications are in gas turbines, jet engines, extruded airframe members; and in die-casting dies including hot-work tools, boring bars, tool shanks, and grinding quills. Others include molds and ladles for testing other metals such as iron and steel, plastic-working dies, piercing points, heat-exchanger parts such as piping, heat shields and structural parts for the nuclear energy industry, welding electrodes, and glass-manufacturing equipment.

Take full advantage of the quality Sylvania builds into its tungsten and molybdenum ingots—for *your* products. Write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**

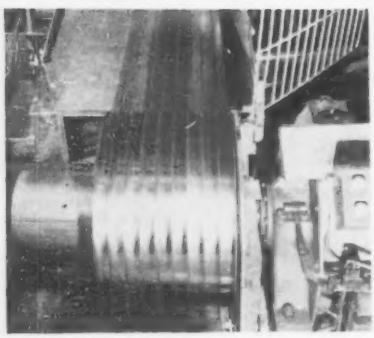
New Materials and Components



Positioning Table Eliminates Jigs and Fixtures

For precision drilling, reaming or tapping operations, a rapid positioning table does away with the need for expensive box fixtures and jigs. This unit positions work accurately on drill presses. At the release of a thumb button on the table positioning handle, an air-operated shot pin drops into a hole in the master template. This action locks the table in position. Ball-bearing mounting permits rapid positioning with minimum effort. Positioning accuracy is ±0.0005 in. (Burgmaster Corp.)

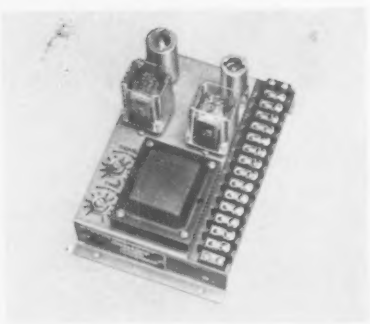
For more data circle No. 22 on postcard, p. 113



Slitter Knives Permit Clean, Burr-Free Cutting

Rotary slitter knives have electronically-controlled tolerances. They insure absolute accuracy in flatness and parallelity. The tolerances are to 0.0001 in. As a result, the knives cut cleaner, burr-free strips, for the steel industry. Precision ground, the knives feature a 6-10 micro-inch finish. The knives are made from generously-sized blanks. They are worked down to a desirable high-grade dense homogenous metal, suitable for heat treating. A special process heat treats the knives for hardness. Due to this special hardening, the knives hold their edges longer and require less regrinding. (Tool Steel Gear & Pinion Co.)

For more data circle No. 23 on postcard, p. 113



Scanner Provides Many Programming Sequences

A versatile control unit adapts to varied services. Such services include: monitoring the flow of slow-moving parts on a conveyor; providing timed energizing of a reject gate for photoelectric inspection of parts. The system combines a sensitive photoelectric scanner-relay and an adjustable electronic timer on the same chassis. This system can also provide a signal for counting while scanning for jam-ups. Sensitivity ranges are from 2 in. to 18 ft. Adjustable time-delay ranges from 1.5-30 seconds. Scanning can be by direct or reflected light. The unit connects to any 100-130 v, 60-cycle line. (Farmer Electric Products Co.)

For more data circle No. 24 on postcard, p. 113

Bandsaw Angle Clamp Saves Milling Time

Saw-blade life is greatly increased through the use of a metal-bandsaw angle clamp. Many hours of milling time can be saved by first rough-sawing the material. This clamp enables the operator to saw flats, tubes, pipes and angle iron of various dimensions without disturbing the square setting of the saw vise in a horizontal metal bandsaw. The fixture easily and quickly clamps in the vise. It is held in position by a screw stop. A clamping arm and screw hold the material securely in place against a positioning pin in the fixture. A safety stop regulates the depth of cut. With this clamp, the economical and convenient use of the bandsaw is increased. (Krieg & Son Machine Shop)

For more data circle No. 25 on postcard, p. 113

Welding Tip Holder

Paddle-type, spot-welding tip holders are designed for welding in confined areas. "T" connectors are not required. The holders come

with standard 4-in. offset, and in shank diameters of ¾, ⅞, 1 and 1¼ in. Tips can be inserted on either side of paddle. (Air Reduction Co., Inc.)

For more data circle No. 26 on postcard, p. 113

Split-Case Pumps

Space requirements have been reduced to a minimum with a new vertical-base mounting design for two-stage, split-case pumps. The case is split parallel with the impeller shaft. Removal of the rotating element is possible without disturbing suction or discharge connections. Enclosed single suction impellers with opposed mounting provides perfect hydraulic balance, and eliminates all thrust strain on bearings. Capacities range to 1400 gpm and heads to 425 ft. (The New York Air Brake Co.)

For more data circle No. 27 on postcard, p. 113

Feather Touch Switch

Designed for sensitive switch applications, a snap-action switch installs easily. The terminal hole per-

mits soldering to terminal. The unusual coil spring mechanism provides for long life, low operating torque and friction-free blade pivot. It is approved for 5 amp, 250 v ac. (Cherry Electrical Products Corp.)

For more data circle No. 28 on postcard, p. 113

Permanent Magnets

A permanent magnet material has outstanding magnetic properties in the non-oriented condition. The new material has a non-oriented energy product of 2.5 million. The magnetic material exhibits a very high coercive force. It resists demagnetization even when subjected to high environmental heat. (Indiana General Corp.)

For more data circle No. 29 on postcard, p. 113

Applies Cutting Fluid

Designed as a more efficient applicator for use with the manufacturer's new cutting fluids, an application unit cuts fluid costs as much as 75 pct wherever cutting

fluids are used. The unit consists of a hand squeeze-bulb, connecting vinyl tube and special ejector head. This head screws to any standard 1-in. screw-neck can. The purpose of the kit is to apply correct amount of fluid, by remote control. It also eliminates unnecessary waste and permits properly timed ejection at the work point—without interrupting work rhythm of the operator. (Tapmatic Corp.)

For more data circle No. 30 on postcard, p. 113

Right-Angle Valve

Using a new lip seal technique for sealing the valve stem, a free-flow, right-angle valve is leak tight. The air-operated, solenoid-controlled valve features simplified

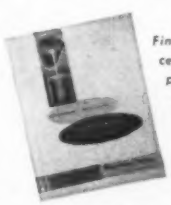
"the HITCHINER way..."

allows flexibility in design with INVESTMENT CASTING

This part is a carrier for a stripper on a citrus peeling machine. It is typical of thousands of irregularly shaped components that are designed with only a particular function in mind and no compromise with production limitations. This type of metal part often requires several changes before the design is finalized.

A late design change in this part, cast in 303 stainless steel, incorporated a 45° bevel, top and bottom on both sides of the serrated pad section. The tooling was altered at very little cost while the cost of the finished casting was not increased at all. The relatively low cost of tooling and tooling changes make the investment casting process an economical and flexible method.

Flexibility in design, a wide freedom of choice in alloy and the elimination of expensive machining operations made possible with the investment casting process may help you solve your parts problems. Send us your sample or blueprint and find out with a Hitchiner "engineered quotation" — no obligation.



Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure on the latest investment casting methods.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 14, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

maintenance and rugged construction. Its features combine to produce a highly efficient valve. (International Pump & Machine Works)
For more data circle No. 31 on postcard, p. 113

Air Filter

Self-cleaning, an automatic drain air filter has centrifugal action that spins out the heavier-than-air solids.

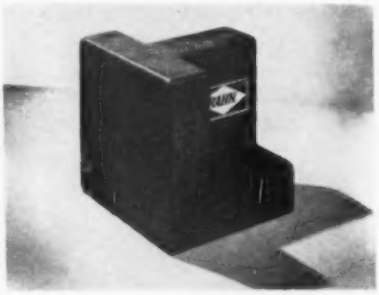
A cartridge of two Monel screens, filters the air. There are no filter elements to replace. The lower end of the unit is threaded ⅛-in. male pipe for attachment of pipe or hose to drain away the condensate. (OEM Equipment)
For more data circle No. 32 on postcard, p. 113

Alloy Steel Anchor

Constructed with a pre-assembled expander plug, an alloy steel anchor eliminates the need for costly chucks. It cuts installation from the normal six steps to two. After drilling the hole, the anchor is set and tight after a few strokes from an ordinary mallet or hammer. It is designed for use in concrete, brick or concrete block. Holding power ranges from 2880-11,500 lb. (U. S. Expansion Bolt Co.)
For more data circle No. 33 on postcard, p. 113

Granite Angle Plate

Granite, six-face right-angle plates are made to utmost precision. They come in two sizes and accuracies: a 6 x 6 x 6 in. and 6 x 9 x 6 in., in both the laboratory grade of 25 millionths and inspection grade of 50 millionths. Six finished faces enable the user to turn the work piece in any position. When one of the full faces is placed in the "up" position, it can be used as a very accurate riser block to elevate a height gage. (Rahn Granite Surface Plate Co.)
For more data circle No. 34 on postcard, p. 113



Mold Wash

Imparting non-sticking properties to mold surfaces toward splashes of molten metal, a silicone mold wash is designed for application on ingot molds used for pouring steels. (General Electric Co.)
For more data circle No. 35 on postcard, p. 113

EXECUTIVE REPORT #9

THEY BLAST BRIDGES BEFORE THEY'RE BUILT

Blast Cleaning Structural Steel Provides Big Savings

Prominent structural steel fabricating plants now blast clean all shapes and sizes of structural steel channels, angles, plates, bar and rod stock—in Wheelabrator cabinets.

The straight-line production made possible by Wheelabrator airless blast cleaning has improved manufacturing efficiency and reduced their cleaning costs substantially. And the shot-blasted finish has proven to be ideal for lasting surface protection of the finished structural members.

Wheelabrator's unequaled experience in descaling structural steel is at your service. Send for new informative bulletin No. 152-D. Write to Wheelabrator Corp., 510 S. Byrkit Street, Mishawaka, Ind. In Canada, P. O. Box 490 Scarborough, Ont.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

NEW BOOKS

"Chipless Machining," by Charles H. Wick, features the descripton of various production processes for the cold working of steel. It also describes the essential steps in making parts by these methods; the design equipment and tooling necessary for the use of the processes; typical applications. Also included are the economies of moving metal rather than removing it. Working data are given on the new processes of spline and gear rolling, radial forging, power spinning, cold extrusion and explosive and other high-energy-rate forming. 502 pages. $10.00 each. The Industrial Press, 93 Worth St., New York 13.

"How to Manage and Help Salesmen," by Charles B. Roth, offers tested methods for giving salesmen the direction and support they need to become top producers. All the methods given in the book center around the sales manager's problem of how to handle the "human element." It is this "human element" on which 87 pct of a sales manager's success depends. The methods enable you to act decisively and deal effectively with the man element. 159 pp. $4.95 per copy. Prentice-Hall, Inc., Englewood Cliffs, N. J.

"A Visit With '500' Die Cast Plants," by Ed. A. Day, is primarily intended for use by management and supervisory personnel in need of answers to specific problems. The book is a comprehensive reference manual and shop-training textbook for the die-casting industry. It has 335 illustrations and drawings, 125 separate chapters and 45 tables of the latest technical data. 600 pages. $10 per copy. American Charcoal Co., 201 S. Green St., Detroit 17.

"Metal - Cutting Bibliography" contains abstracts of literature on chip-producing processes. The reference work is the result of four years of work contracted by ASTME's Research Fund to The John Crerar Library in Chicago. After reviewing over 18,000 books, papers, pamphlets and articles from around the world, 5593 abstracts of original material were prepared and coded for inclusion in the book. An author index of 19 pages and a 162-page subject index are included. 1000 pages. $20 a copy. ASTME Research Fund, 10700 Puritan Ave., Detroit 38.

"Standardization Activities in the United States—A Descriptive Directory," by Sherman F. Booth, provides a descriptive inventory of the work and objectives of organizations involved in standardization activities. Each organization is listed alphabetically with a brief description of its standardization area and accomplishments. 210 pages. $1.75. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

EXECUTIVE REPORT '19

TOUGH CLEANING JOBS

call for the mighty SUPER TUMBLAST

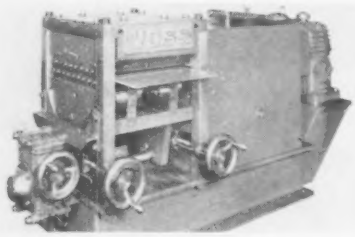
With tireless cleaning power and super performance features, the Wheelabrator Super Tumblast gives you the ultimate in cleaning efficiency and production capacity. It's engineered throughout as a *heavy duty* batch type airless blast mill, to handle the rough and tough cleaning jobs, clean efficiently, save abrasive, give maximum parts wear, and go easy on maintenance costs.

Super Tumblast performance is proven in nearly 200 successful installations

The Super Tumblast has demonstrated its ability to handle the really tough cleaning jobs, deliver high production, superior cleaning results, exceptional labor savings and unequalled economy. Get all the facts from Wheelabrator Corporation, 510 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ont.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

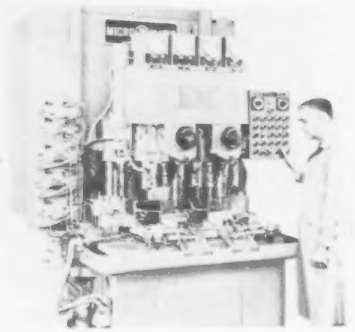
New Equipment and Machinery



Parts Flattener Eliminates Hand Straightening

Rapidly and automatically, a machine straightens stamped parts. The flattener always maintains finished dimensions within 0.002 to 0.003 in. of dead flatness. The operation of the parts flattener is based on a series of small diameter work rolls. Multiple back-up bearings support the rolls. The parts are worked to relieve stresses. This obtains almost dead flatness in one pass. (Voss Engineering Co.)

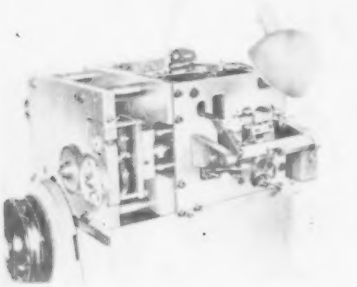
For more data circle No. 36 on postcard, p. 113



Unit Microhones Parts to Close Tolerances

Microhoning a wide variety of parts, a mechanical-stroke machine adapts to any degree of automatic operation. Workpieces may be automatically processed through the complete microhoning cycle. Pregaging insures safe tool entry. If the gage plug cannot enter the workpiece, the microhoning cycle stops. On this machine, workpieces are automatically sized along the full length of the bore. Actual inside diameter size is indicated on dials during the microhoning cycle. In segregation, every workpiece is separated according to one of three finished size categories. Distance between spindles is 12 in. (Micromatic Hone Corp.)

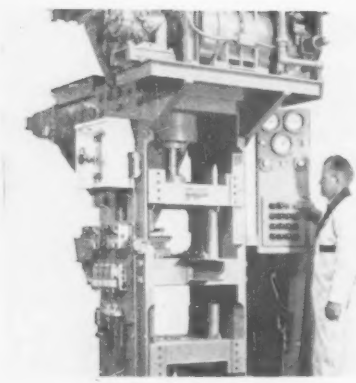
For more data circle No. 37 on postcard, p. 113



Machine Fabricates Spring in One Cycle

A spring making machine offers cost-saving opportunities for industries producing springs, clips, clamps, coils and related wire products. The machine produces an entire spring with formed end loops in a single cycle. The spring generating unit can make different end loops, including extended hooks. It also has the ability to make many types of springs; the load tolerance is decreased to ±5 pct. Production rate with a variable-speed drive is 720-6400 pieces per hour. The machine weighs 420 lb. It occupies a floor space (less wire reel) of 22 x 27 in. The spring generator will accept wire from 0.008-0.034 in. in diam. (The Baird Machine Co.)

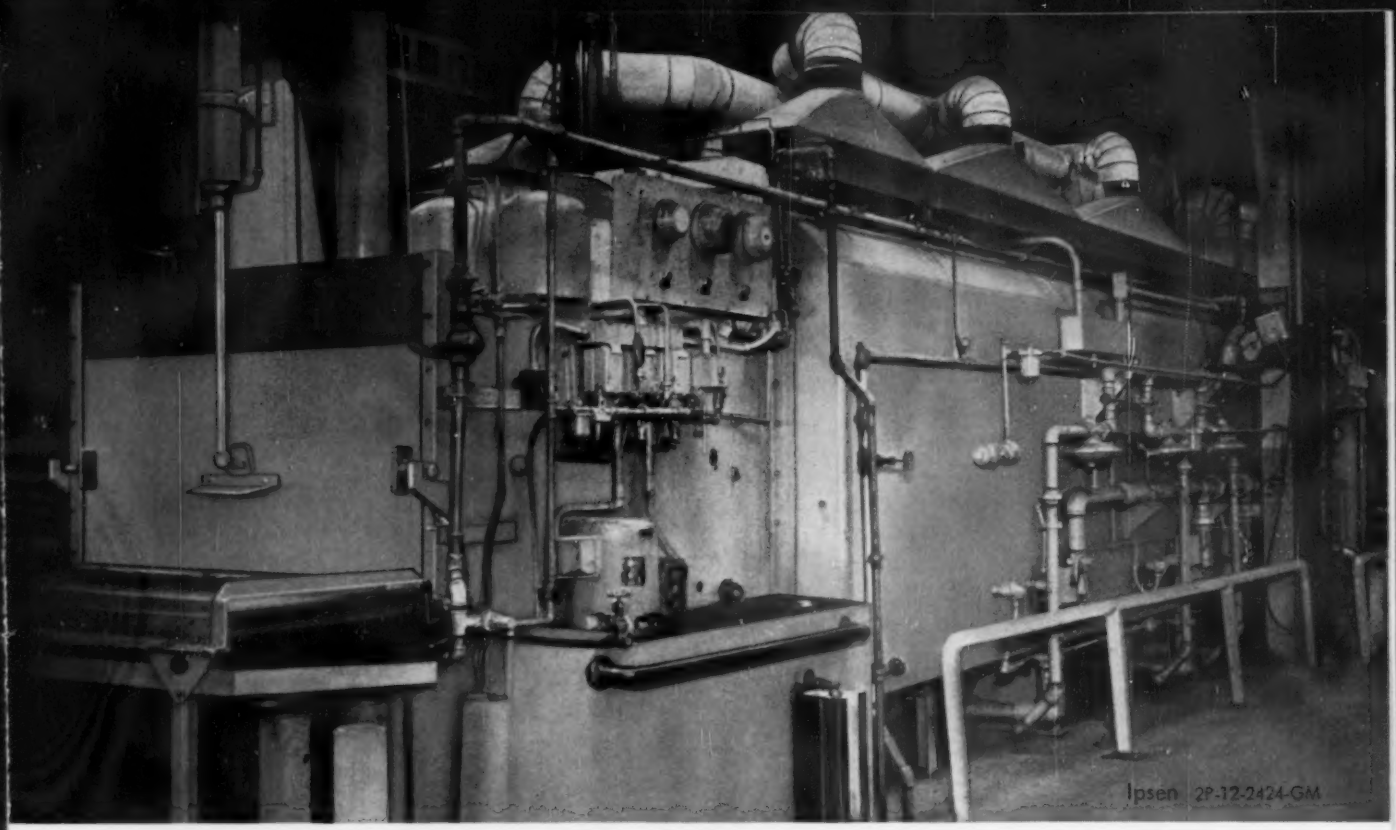
For more data circle No. 38 on postcard, p. 113



Hydraulic Press Compacts Powder Metals

Fully automatic, a 100-ton, opposed-ram hydraulic press compacts or briquettes powder metals, refractory materials and abrasives. It is designed for continuous automatic high-speed operation; with the operator taking care of piece removal and filling the hopper. Press design includes: continuous oil filtration and cooling by water. Automatic, spray-type die lubrication is provided and incorporated into the press cycle. A spray dwell timer and cycle counter controls duration and frequency of lubrication. All press controls are grouped on the main control panel at the operator's position. They are arranged for jogging, for setup as well as for full automatic cycle. Each of the platens is arranged for simple tooling. (K. R. Wilson, Inc.)

For more data circle No. 39 on postcard, p. 113



Production Carburizing

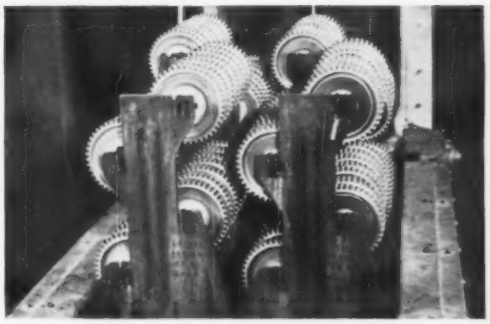
Five years ago the first Ipsen Double Row 4-Zone Pusher was built.. see photo above. It is now six years since the first Deep Case Carburizing Unit was built. BIG Ipsen controlled atmosphere pushers have given unexcelled metallurgical results!

Check these features when you consider a carburizing furnace. They are exclusive with Ipsen.

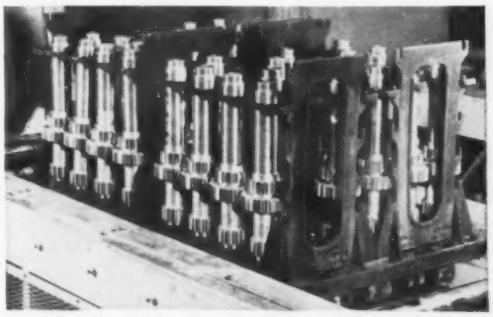
- Enclosed Charging Mechanism (Pat. No. 2,896,775)
- Chain Discharging Mechanism (Pat. No. 2,842,349)
- Baffles for 100% Forced Convection Heating (Pat. No. 2,788,205)
- Ceramic Heating Tube Mounting (Pat. No. 2,822,798)
- Ceramic "Flame-Busters" (Pat. No. 2,861,596)
- Ceramic Fan (Pat. No. 2,730,352)
- Water-Cooled Fan Motor (Pat. No. 2,800,317)
- Quench Oil Flow System (Pat. No. 2,854,013)

Other Patents Pending

Ipsen Pusher furnaces are described in Bulletin P-59. Send for your copy today.



This charge of steel gears is typical of work handled in Ipsen Production Carburizing Furnaces. Heating was 1700° F for 10 hours; oil quenched at 150° F. Case depth: .045".



Countershafts ready for charging into Ipsen Production Carburizing Furnace. Heating time was 10 hours at 1700° F; quenching was in oil at 150° F. Case depth: .045".

AUTOMATIC Ipsen HEAT TREATING UNITS

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WASHINGTON STEEL CORPORATION

Washington, Pa.

*REG. T.M.

The Iron Age Summary

No Recovery Likely in November

Probable dropoff in automotive tonnage makes the outlook for November on the gloomy side.

Automotive cutbacks are compounded by poor business in other big steel consuming businesses.

▪ Steel business in November will be down from October. Furthermore, December is not likely to show any improvement in orders.

This means that any recovery in steel operations is now set back into 1961.

Change in Feeling—This gloomy forecast is in contrast to what had been a slightly better feeling in the steel market in recent weeks. But new factors, principally cutbacks in automotive orders and indications of lower overall volume in November resulted in the setback in the market.

But there is one important qualification to this prediction:

Orders, even from major users like the automakers, are on a week-to-week, even day-to-day basis. This makes long-range predicting difficult because any steel user can change his plans, and orders, over night. A surge of late orders during the month could bring November improvement. But, at best, November can not be called a recovery month.

There are these few encouraging points:

There is a slight overall improvement in the number of orders to compensate for the expected decline in automotive tonnage.

Inventories are low, and buying of steel is running closer to consumption.

Some merchant pig furnaces have been put back into production in the Midwest.

Some warehouses, again in the Midwest, report occasional production-size orders for steel, particularly sheet.

Special Effort—Individual companies report occasional order improvement not in line with the overall pattern. But in many cases, the companies discount them in market evaluation but as the result of special projects.

The disappointing November outlook is principally the result of evaluation of the automotive production and sales outlook. October auto production is well over the 7 million per year rate. Unless auto sales pick up, auto production will have to be cut back in the last two months of the year.

Production Questions—This rate will leave one million cars in dealer hands by the end of the month. Of this total, possibly 750,000 will be new models, with the rest unsold 1960's. If production should go at the rate of 600,000 cars a month through November and December, there could be well over a million cars in inventory by the end of the year. So unless sales pick up rapidly, automotive steel tonnage will drop.

In addition, layoffs are scheduled, or are already being made, in some of the other major steel-consuming industries. These include appliances, farm implement, and heavy construction equipment makers.

And there is no pickup likely in railroad, oil country, or steel warehouse buying.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,516	1,579	1,558	371
Ingot Index				
(1947-1949=100)	94.4	98.3	97.0	23.1
Operating Rates				
North East Coast	56.0	59.0*	65.0	12.0†
Buffalo	61.0	60.0*	42.0	0.0†
Pittsburgh	47.0	49.0*	46.0	30.0†
Youngstown	42.0	44.0*	46.0	10.0†
Cleveland	57.0	57.0*	59.0	0.0†
Detroit	69.0	71.0*	67.0	24.0†
Chicago	56.0	60.0*	59.0	5.0†
Cincinnati	61.0	62.0*	61.0	69.0†
St. Louis	74.0	73.0*	79.0	101.0†
South	46.0	51.0*	49.0	12.0†
West	49.0	54.0	54.0	0.0†
U. S. Rate	53.2	55.4	54.7	13.1

*Revised. †IRON AGE Estimate.

Source: American Iron and Steel Institute.

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.32	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$29.50	$29.50	$31.50	$46.17
No. 2 bundles	$19.83	$20.17	$22.17	$31.50
Nonferrous				
Aluminum ingot	26.00	26.00	26.00	26.80
Copper, electrolytic	30.00	30.00*	33.00	30-31.5
Lead, St. Louis	11.80	11.80	11.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	103.125	103.125	102.25	101.75
Zinc, E. St. Louis	13.00	13.00	13.00	12.5-13

Package System Aids Scales

With the added help of a new sales approach, the production of scales is expected to be 10 pct better than last year.

However, some manufacturers are still a little edgy about present orders.

■ The scale industry continues to show increased production. In fact, scale volume for 1960 has exceeded 1959 in each quarterly survey, according to the Scale Manufacturers Assn. This year is expected to end nearly 10 pct better than 1959.

What makes the growth significant is that 1959 was the highest volume year in the industry's 130-year history. Production was 11 pct above the previous record set in 1956.

With the exception of a 5 pct drop in 1958, scale production has shown a steady increase in each of the past six years. The increase is led by industrial and commercial type scales.

Edgy Manufacturers—However, even though volume has been high this year, many scale manufacturers are a little edgy about new orders in the near future. At the present time, they are not burdened with heavy back orders and deliveries are good. But a sudden drop in sales could slow production.

One manufacturer told The IRON AGE, "Backlogs in our business are very seasonable. In the fall they are practically nonexistant. But in the spring of this year, they were twice that of last year."

The big trend in scale manufacturing is automation. Moves toward electronic readout systems for more rigid controls are being made throughout the industry. The push button, repetitive operation is now considered standard.

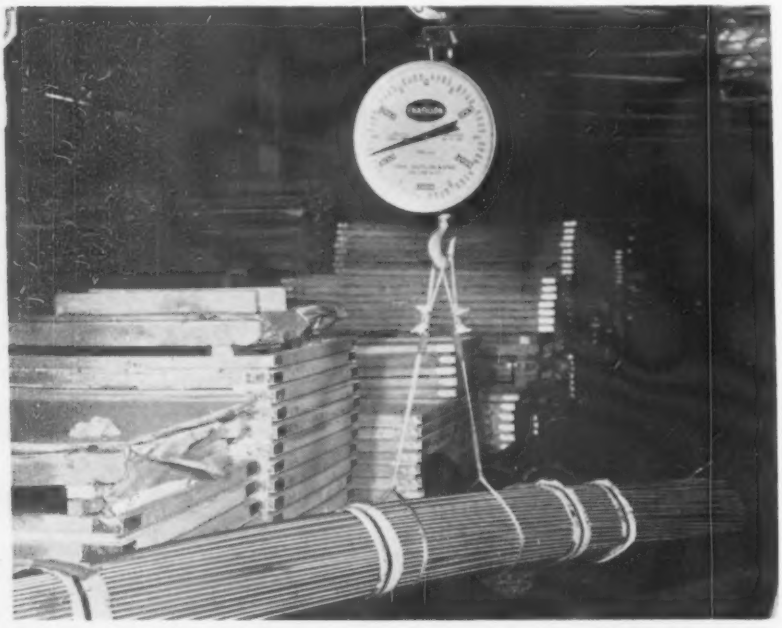
New Sales Approach — Bearing this in mind, manufacturers are using a new sales approach. Says one: "Systems are now being sold to do the job. However, the scale is probably the heart of the system."

He adds, "In many cases, the scale, as normally sold, is a very small cost factor in the overall picture. Sometimes it's as little as 10 pct of the total cost. By selling weighing control systems instead of just scales, we expect our sales to continue upward."

Manufacturers are beginning to realize that scale design is relatively unimportant because industry as a whole is scale conscious. The job for the scale industry, according to one manufacturer, is to prove that a better product, at a reduced cost, is possible through the use of modern batching and formula control systems, accounting systems co-ordinated with the weighing systems and punch card programing.

A Money Machine—Another factor in the growth of industrial scale production, according to SMA, is the recognition of the scale as a "money machine." It claims, "The accurate scale can protect the owner's profit, whereas the inaccurate scale can cost him all or a large part of the expected profit. Today the user is testing his scales more frequently and replacing those shown to be unreliable."

Generally, the industry expects prices to remain either stable or drop during 1961. Most deliveries now range from six days to two weeks, although one company reports delivery dates of one month.



SALES ARE UP: The scale industry says sales are up this year. Largely responsible for this is a new approach where systems are sold with the scale serving as the heart of the system. (Photo: John Chatillon & Sons.)

HOW LONG SINCE YOU CHECKED ON PERFORATIONS?

No matter what material your product demands Mundt can supply the exact perforation you need. Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics, and paper are punched as required for every functional and ornamental need.

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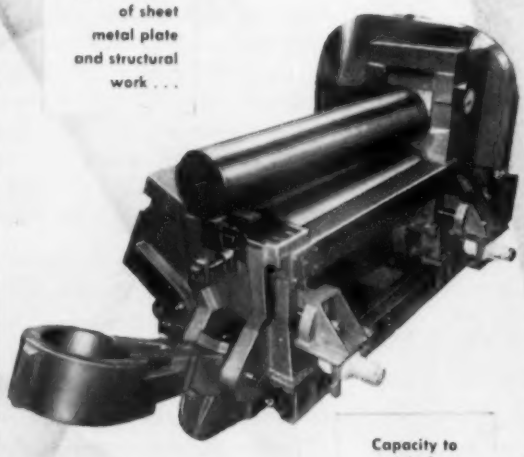

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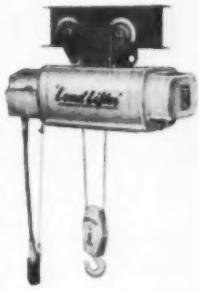


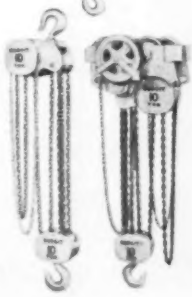
AIR HOISTS

Budgit Air Hoist. Link and roller chain types. Pendant cord control. Speeds infinitely variable to 75 FPM. Rigid mount push trolley available. Safety hooks standard. ¼, ½ and 1 ton. Also Load Lifter Air Hoists with wire rope load line to 15 tons.

CHAIN BLOCKS

Budgit Chain Blocks. ¼ to 10 tons. Light, tough aluminum frame. 25 lb. pull on hand chain lifts 500 lbs. Fast action load brake makes lowering easy. Hook suspension or Army type trolley.

Tugit Lever-Operated Hoist. Light, compact, portable. Easy to operate even in close quarters — lifts or pulls at any angle. A fine maintenance tool. ¾ to 3 tons.



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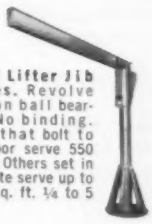
Budgit Crane Assemblies. Low-cost "build it yourself" kits to construct single girder cranes up to 6 tons and 30 ft. span without special tools. You buy I-beam locally to save more. Packaged electric bridge drive adds efficiency. Kits also for 180° swinging bracket jib cranes up to 4½ tons, 10 ft. reach.



Load Lifter Jib Cranes. Revolve 360° on ball bearings. No binding. Types that bolt to the floor serve 550 sq. ft. Others set in concrete serve up to 1500 sq. ft. ¼ to 5 tons.

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Mills Still Battle To Speed Delivery

With delivery promises about as short as possible, some mills still try to pare them further.

An example: Midwest producers have cut shipping estimates on sheet and strip products another week.

▪ It seems impossible, but some mills are still trimming time from their delivery estimates.

Compared to month-ago reports, the newest drop involves sheet, strip, shapes, and linepipe products. Some mill shipping promises are down about a week at Chicago and West Coast markets.

In other areas—the East Coast, Pittsburgh, Cleveland, and Detroit—most delivery estimates stayed about the same. The reason: They are about as short as they can get. (See table below).

Slight Detroit Gain—In one market, however, a few delivery promises stretched a bit. At Detroit, a week was tacked on estimated shipping times for hot-rolled sheet and strip, standard structurals. But these products could still be obtained, in some cases, in two weeks or less.

Mill efforts to make fast deliveries reflect the continued dull tone of sales. Many sheet mills are keeping stocks of coil so they can fill orders in a week or less. At Midwest mills, delivery times for cold-rolled and hot-rolled sheet and strip are all down a week.

Buyers Call Tune—Steel sellers must keep flexible schedules to land sales. In many cases, customers are buying on a weekly basis. Orders come in well at the beginning of the week, then taper off near the end. Buyers often wait until the last minute to place orders.

Sheet and Strip — Auto industry users are giving the market any life it has. Apart from that, the outlook for mills is discouraging. Producers at **Pittsburgh** look for November sales of auto sheet to fall below this month's level.

Cold-rolled sheet has been pulling much better than strip for **Detroit** area mills. Sales officials there say they are having a hard time filling strip quotas.

Bars—Sales of auto bar items were better than those for flat-rolled products in the third quarter, a major mill comments. But, so far in the fourth quarter, the gains are not as great. However, service centers report recent mild sales gains for bar grades—including both hot-rolled and cold-drawn products.

Plates and Shapes—Market for these products continues to edge up. But the advance is slow and slight. One large **East Coast** mill says sales of heavy steel products showed a little more life last week. But the gain appears to be only for this company and not large-scale. **Pittsburgh** mills say any gains are slight and too uncertain to be called a trend. A cutback in linepipe orders has hurt plate sales in the Midwest.

Pig Iron Composite—This week's IRON AGE Pig Iron Composite dropped slightly—falling 9¢ to a new total of $66.32. This reflected recent freight changes downward as railroads were allowed a "special highway competitive rate adjustment." Freight increases, which went into effect Oct. 6, were not enough to offset this adjustment.

Pipe and Tubing — Orders for standard pipe are showing no real lift. But some **Pittsburgh** warehouses are landing mill-sized orders from buyers unable to wait for mill delivery.

Jobber allowances on cold-drawn electricweld tubing will be revised in the near future. The change involves increasing allowances on smaller quantities. New allowances will give jobbers the same margins on electricweld they have on cold-drawn seamless.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	2–5 wks	2–4 wks	3–5 wks	3–5 wks	1–3 wks	4–5 wks
HR Carbon Sheet	2–4 wks	2–4 wks	1–3 wks	2–4 wks	1–2 wks	4 wks
CR Carbon Strip	2–5 wks	3–5 wks	3–5 wks	3–5 wks	1–3 wks	4 wks
HR Carbon Strip	2–4 wks	2–4 wks	1–3 wks	2–4 wks	1–2 wks	4 wks
HR Carbon Bars	2–4 wks	1–3 wks	1–4 wks	Stock–4 wks	Stock–2 wks	3–4 wks
CF Carbon Bars	2–4 wks	1–3 wks	Stock–8 wks	Stock–6 wks	Stock–4 wks	1–2 wks
Heavy Plate	2–3 wks	1–2 wks			1–2 wks	4 wks
Light Plate	2–3 wks	1–2 wks			1–2 wks	4 wks
Merchant Wire	Stock	Stock			Stock	2 wks
Oil Country Goods	Stock	Stock			Stock	
Linepipe	Stock	1–4 wks			3–4 wks	4 wks
Buttweld Pipe	Stock	Stock	Stock–2 wks	Stock	Stock–2 wks	Stock
Std. Structurals	2–4 wks	1–2 wks	1–4 wks	1–5 wks	1–2 wks	2–3 wks
CR Stainless Sheet	Stock–4 wks	Stock–3 wks	1–4 wks	Stock–5 wks		
CR Stainless Strip	Stock–4 wks	Stock–3 wks	1–4 wks	Stock–5 wks		

COMPARISON OF PRICES

(Effective Oct. 25, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Oct. 25 1960	Oct. 18 1960	Sept. 27 1960	Oct. 27 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Oct. 25 1960	Oct. 18 1960	Sept. 27 1960	Oct. 27 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.11*	$70.57	$70.57	$70.57
Foundry, South Cin'ti.	71.79*	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	69.61*	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb†	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.32*	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$28.50	$28.50	$31.50	$47.50
No. 1 steel, Phila. area	33.50	33.50	34.50	46.50
No. 1 steel, Chicago	26.50	26.50	28.50	44.50
No. 1 bundles, Detroit	23.50*	25.50	27.50	40.50
Low phos., Youngstown	27.50*	29.50	33.50	48.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	47.50	55.50
No. 1 mach'y cast, Phila.	48.50*	49.50	49.50	53.50
No. 1 mach'y cast, Chicago	41.50	41.50	43.50	64.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$29.50	$29.50	$31.50	$46.17
No. 2 bundles	19.83*	20.17	21.17	31.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00**	33.00	30-31.50
Copper, Lake, Conn.	30.00	30.00**	33.00	31.50
Tin, Straits, N. Y.	103.125†	103.125	102.25	101.75
Zinc, East St. Louis	13.00	13.00	13.00	12.5-13
Lead, St. Louis	11.80	11.80	11.80	12.80
Aluminum, ingot	26.00	26.00	26.00	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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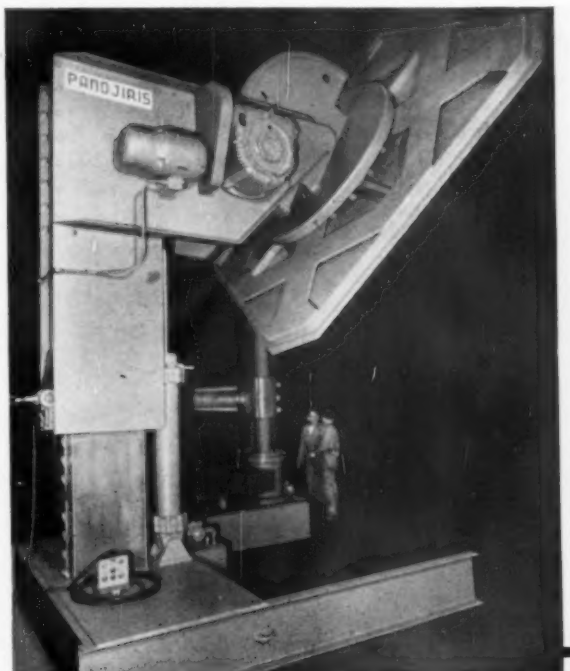

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How Far Down Is the Bottom?

The scrap market continues soft with additional price drops reported.

Most areas expect the market to become even softer. However, a few predict the beginning of an upswing.

■ The market this week continues soft with most areas reporting more price drops. However, the IRON AGE composite price for No. 1 heavy melting holds at $29.50; the composite price for No. 2 bundles dipped to $19.83.

Just when will the scrap market's bottom be reached?

William B. Story, assistant executive vice president, Institute of Scrap Iron & Steel, expressed "cautious optimism" for a near-future rise in scrap consumption while speaking in Pittsburgh recently.

Nevertheless, pessimism continues to reign among scrapmen. In fact, only four areas—Chicago, St. Louis, Houston, and Detroit—report any inkling of an upswing. On the other hand, scrapmen in New York, Birmingham, Philadelphia, Pittsburgh, Cleveland, Cincinnati and the West Coast are braced for additional drops. Reports from Buffalo and Boston don't predict a move in either direction.

Pittsburgh—Another big tonnage of industrial scrap is heading toward a quiet, weak market. Tonnage on one major list is up more than 20 pct from October. Moreover, extra lots are being offered by auto plants with scrap surplus. These late offerings brought prices lower than early October bids. With mills showing little interest in scrap at any price, the main lists must depend on brokers for support. All these factors point strongly to a general market break. With dealer scrap tight at current prices, trading could come to a standstill.

Chicago—The market continues to indicate a mild tightening at the dealer level. Several short sales with three weeks to cover have been turned down at current price levels. This indicates at least some dealer upswing during the next month. New sales in electric furnace pegged this grade slightly higher.

Philadelphia — Export demand for openhearth grades is still active in this market. However, some dealers believe November will bring an easing of exports. The overall market dropped this week as domestic orders remain scarce. Some scrapmen believe prices are now leveling off and an upswing will start soon. Nevertheless, most remain pessimistic.

New York—Severe pressure from export buyers forced steelmaking grades down $1 earlier this week. Dealers say buyers are now apparently taking cues from inland U. S. markets rather than their own specific needs. In the last few price cuts, the pressure built up right after prices fell inland. Dealers feel this pattern is likely to continue for a while.

Detroit—The market is definitely weaker. Prices continue to fall for all items and the early industrial lists for November reflect lower prices. There is no domestic interest in scrap and dealer inventories are high. Canadian interest is expected to have a bearing on the market soon, but just how much of a bearing is not known. Chrysler Corp.'s scrap offering is around 15 pct below October and Ford Motor Co. is not expected to be selling.

Cleveland—The market is off another $2 on steelmaking grades as new tonnage of industrial lists overhangs the market at depressed prices. A tonnage of re-bid scrap went for $26.50 on the track. November tonnage is expected to go for even less.

Cincinnati—The market is off another $1 on steelmaking grades as major consumers stay out of the market. Only small tonnages can go upriver and industrial scrap overhangs the market.

St. Louis—A "wait-and-see" attitude prevails here. There is some hope that a pickup in scrap buying will take place in November, but very few, if any, are really predicting. Currently, prices remain weak and depressed.

Birmingham — Although some scrap continues to move, there is no urgency to buy on the part of mills and foundries and the general market looks weaker.

Buffalo—The market is quiet and prices have weakened. No. 1 heavy melting, No. 1 busheling, and No. 1 dealer bundles are all down $2. Other grades are off $1.

Boston—There's still no business and the market is dull. There are no price changes.

West Coast—Exporting to Japan is practically the only activity. The scrap flow into dealers' yards has fallen off sharply. Some dealers are in financial trouble.

Houston—The market is quiet. Export is also slow although some buying is being done in anticipation of late ship arrivals. Some foundries are showing an interest in electric furnace scrap.

Rubber takes pounding that wears holes in steel

BIG chunks of ore—some weighing up to 2 tons—crash down from that vibrating feeder to a wear pad below. This terrific pounding 8 hours a day, 5 days a week, quickly wore holes in a wear pad of ½" thick steel plate, caused frequent shut-downs for repairs and replacement.

To avoid these costly delays, a B.F.Goodrich distributor suggested a wear pad made of a rubber called Armorite, specially compounded to stand this sort of a beating. This rubber is soft enough to *give* under the pounding it gets, yet so tough that it is even used in some places to carry broken glass.

The Armorite wear pad stood up under the pounding for 14 months —six times longer than the steel plate. And the Armorite wear pad pictured at left, which replaced the first when it finally wore out, is expected to last even longer because of a different method of installation.

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SCRAP PRICES *(Effective Oct. 25, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	30.00 to 31.00
No. 1 factory bundles	33.00 to 34.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Low phos. punch'gs plate	34.00 to 35.00
Heavy turnings	25.00 to 26.00
No. 1 RR hvy. melting	34.00 to 35.00
Scrap rails, random lgth.	43.00 to 44.00
Rails 2 ft. and under	48.00 to 49.00
RR specialties	38.00 to 39.00
No. 1 machinery cast	45.00 to 46.00
Cupola Cast	35.00 to 36.00
Heavy breakable cast	33.00 to 34.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	85.00 to 90.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy melting	24.00 to 25.00
No. 1 dealer bundles	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	26.00 to 28.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. forge crops	37.00 to 39.00
Low phos. punch'gs plate, ¼ in. and heavier	33.00 to 35.00
Low phos. 2 ft. and under	31.00 to 33.00
No. 1 RR hvy. melting	31.00 to 32.00
Scrap, rails, random lgth.	38.00 to 39.00
Rerolling rails	48.00 to 50.00
Rails 2 ft. and under	42.00 to 43.00
Angles and splice bars	39.00 to 40.00
RR steel car axles	47.00 to 48.00
RR couplers and knuckles	36.00 to 37.00
No. 1 machinery cast	41.00 to 42.00
Cupola cast	36.00 to 37.00
Cast iron wheel	27.00 to 28.00
Malleable	40.00 to 41.00
Stove plate	30.00 to 31.00
Steel car wheels	35.00 to 36.00
Stainless	
18-8 bundles and solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	80.00 to 85.00
430 turnings	40.00 to 45.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Clean cast. chem. borings	23.00 to 24.00
Low phos. 5 ft and under	36.00 to 37.00
Low phos. 2 ft punch'gs	38.00 to 39.00
Elec. furnace bundles	35.00 to 36.00
Heavy turnings	26.00 to 27.00
RR specialties	38.00 to 39.00
Rails, 18 in. and under	49.00 to 50.00
Cupola cast	38.00 to 39.00
Heavy breakable cast.	36.00 to 37.00
Cast iron car wheels	39.00 to 40.00
Malleable	45.00 to 46.00
No. 1 machinery cast	48.00 to 49.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	15.00 to 16.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Low phos. 18 in. and under	33.00 to 34.00
Rails, random length	38.00 to 39.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast	35.00 to 36.00
Hvy. breakable cast.	30.00 to 31.00
Drop broken cast.	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	21.50 to 22.50
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	18.50 to 19.50
Machine shop turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Low phos. plate	27.00 to 28.00

Cleveland

No. 1 hvy. melting	$23.50 to $24.50
No. 2 hvy. melting	17.50 to 18.50
No. 1 dealer bundles	23.50 to 24.50
No. 1 factory bundles	28.00 to 29.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	23.50 to 24.50
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Cut structural & plates, 2 ft. & under	30.00 to 31.00
Low phos. punch'gs plate	24.50 to 25.50
Drop forge flashings	23.50 to 24.50
Foundry steel, 2 ft. & under	29.00 to 30.00
No. 1 RR hvy. melting	30.00 to 31.00
Rails 2 ft. and under	45.00 to 46.00
Rails 18 in. and under	46.00 to 47.00
Steel axle turnings	20.00 to 21.00
Railroad cast	44.00 to 45.00
No. 1 machinery cast	44.00 to 45.00
Stove plate	36.00 to 37.00
Malleable	43.00 to 44.00
Stainless	
18-8 bundles	175.00 to 180.00
18-8 turnings	70.00 to 75.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 busheling	25.00 to 26.00
No. 1 dealer bundles	25.00 to 26.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	12.00 to 13.00
Low phos. plate	33.00 to 34.00
Structurals and plate, 2 ft. and under	35.00 to 36.00
Scrap rails, random lgth.	34.00 to 35.00
Rails 2 ft. and under	44.00 to 45.00
No. 1 machinery cast	44.00 to 45.00
No. 1 cupola cast	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	26.00 to 27.00
Foundry steel, 2 ft.	28.00 to 29.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	19.00 to 20.00
Machine shop turn.	7.00 to 8.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	18.00 to 19.00
No. 1 RR hvy. melting	30.00 to 31.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	37.00 to 38.00
RR specialties	35.00 to 36.00
Cupola cast	40.00 to 41.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	35.00 to 36.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	48.00 to 49.00
Unstripped motor blocks	35.00 to 36.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	31.00 to 32.00
Elec. furnace, 3 ft. & under	34.00 to 35.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rail, random lgth.	37.00 to 38.00
Rails, 18 in. and under	43.00 to 44.00
Angles and splice bars	38.00 to 39.00
No. 1 cupola cast	46.00 to 47.00
Stove plate	46.00 to 47.00
Cast iron car wheels	36.00 to 37.00
Unstripped motor blocks	34.00 to 35.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	19.00 to 20.00
No. 2 dealer bundles	14.00 to 15.00
Machine shop turnings	5.00 to 6.00
Mixed bor. and turn.	7.00 to 8.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast	37.00 to 38.00
Mixed yard cast.	33.00 to 34.00
Heavy breakable cast.	31.00 to 32.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$20.00 to $21.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	20.00 to 21.00
Drop forge flashings	20.00 to 21.00
Machine shop turn.	7.00 to 8.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Heavy breakable cast.	23.00 to 24.00
Mixed cupola cast.	31.00 to 32.00
Automotive cast.	37.00 to 38.00
Stainless	
18-8 bundles and solids	155.00 to 160.00
18-8 turnings	45.00 to 50.00
430 bundles and solids	50.00 to 55.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	3.50 to 4.50
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	11.00 to 12.00
No. 1 machinery cast	37.00 to 38.00
Mixed cupola cast	31.00 to 32.00
Heavy breakable cast.	25.50 to 26.50

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	$27.00 to 28.00
No. 2 bundles	18.00
Machine shop turn.	14.00
Cast iron borings	45.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	27.00
No. 1 dealer bundles	25.00
No. 2 bundles	17.00
Machine shop turn.	12.00
Shoveling turnings	13.00
Cast iron borings	13.00
Elec. furnace 1 ft. and under (foundry)	41.00
No. 1 cupola cast.	$38.00 to 39.00

Seattle

No. 1 hvy. melting	$33.00
No. 2 hvy. melting	31.00
No. 2 bundles	21.00
No. 1 cupola cast	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

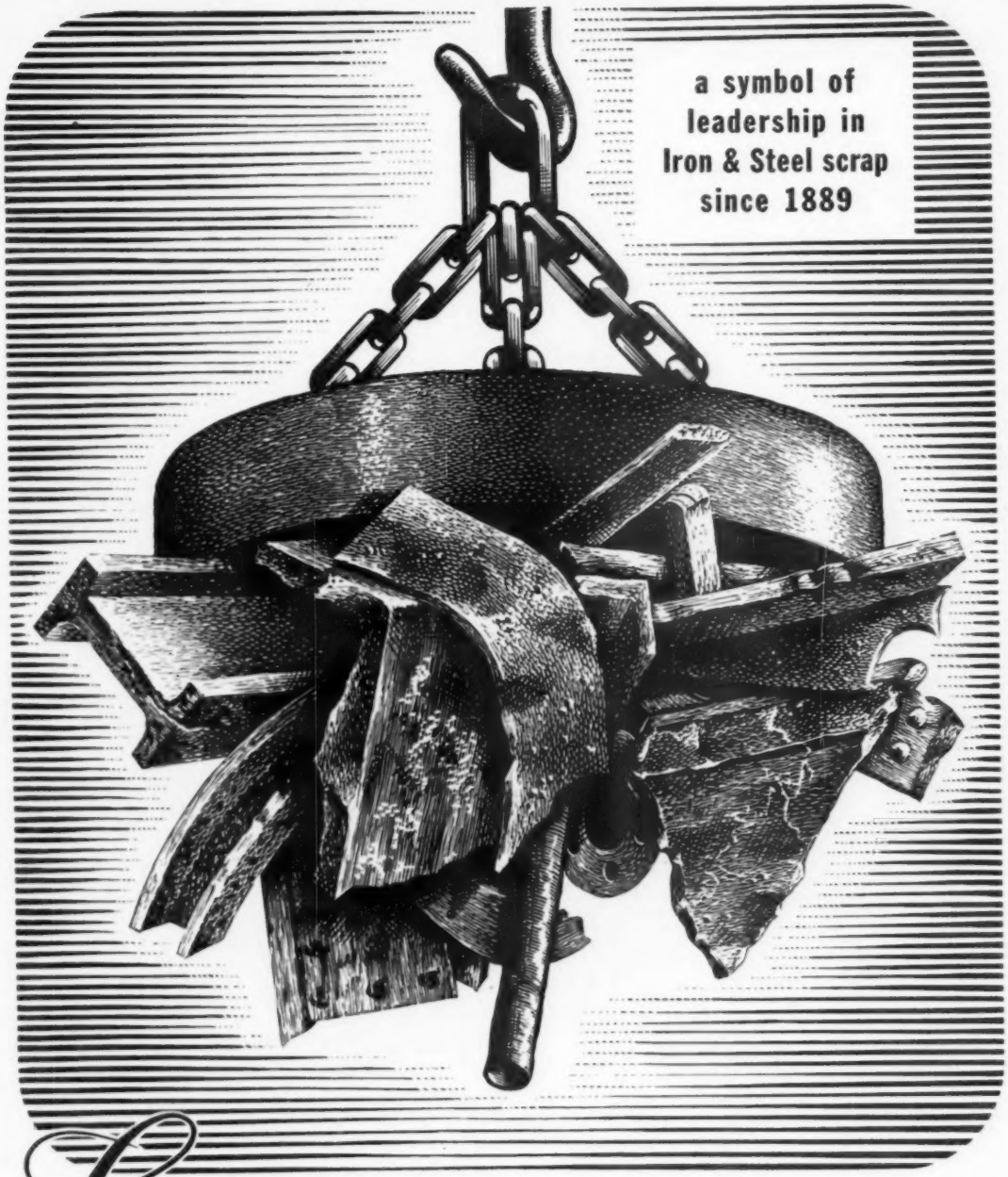
Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$25.80
No. 2 hvy. melting cut 3 ft. and under	22.50
No. 1 dealer bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bush., new fact, prep'd	25.50
Bush., new fact, unprep'd	20.45
Machine shop turn.	10.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 2 bundles	20.50
Machine shop turn.	12.00
Shoveling turnings	14.00
Cut structural plate 2 ft. & under	$40.00 to 41.00
Unstripped motor blocks	26.00 to 27.00
Cupola cast.	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00



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Copper Industry Needs "Discipline"

One copper executive says his industry needs to "discipline" itself to create stability.

Current weak market and unsteady price structure is given as an example.

▪ The copper industry could use more stability to help open up new markets, and expand current ones. But don't look for a really stable price picture for some time.

That's the opinion of a top U. S. copper executive. And he offers some reasons for his view:

First, a lower price traditionally does not bring new strength to the copper market. Based on past performance, consumers expect and wait for further price drops. Despite all copper's talk of stability, few consumers are apparently changing their attitudes.

Little Confidence — Right now, despite the sharpness of recent copper price cut and the talk that producers will be able to hold this level for a reasonable period, there is little confidence in this level among consumers.

Considered of equal importance by this executive: "Copper managements have plenty of tacticians and few strategists." There is general agreement of the value of a stable price, he notes. But there seems to be no substantial approach to accomplish this by fully weighing the worldwide nature of copper markets, and their susceptibility to a wide range of political and natural events.

Must Learn Discipline—"One of the first things the copper industry management must learn is discipline," says this commentator. His implication: Producers must readily adjust output to meet demand.

How did the copper industry manage to hold prices so stable in 1960? Just the fortunate accident of the relation of several occurrences, he says.

While the U. S. economy, and demand for copper, sagged, Europe boomed. And when the European economy started to level off, trouble in South Africa, then the Congo, prompted extensive hedge buying, he explains.

Assuming "discipline," copper has a very bright competitive picture over the long haul, says this copper man.

Lower Costs Coming — "New copper properties are coming in at the 'right' end of the cost range, in direct contrast with many other metals," he notes. With such advantages as large bodies of high grade ores and automation, mines will produce copper more cheaply than many current operations. This will move the cost median down and give producers more room to adjust price and output to realistic levels they can support, he says.

As an afterthought: "Of course many of the new properties are outside the U. S. I expect this country to become progressively less important as a mine source for copper," concludes the speaker.

Aluminum

One prominent metal market analyst, Stewart Spector, Bache & Co., dismisses the probability of new increases in aluminum capacity in the near future.

Conceding aluminum's growth potential, Mr. Spector offers five reasons not to expect much new capacity:

1. Technological advances in smelting will let the industry boost capacity of current facilities 10 to 15 pct at a lower cost.

2. Industry lacks the stimulus of government programs that would protect them with fast tax write-offs.

3. The industry has no long-term government contracts as a market buffer.

4. Producers have a heavy debt position in relation to their equity.

5. The huge government stockpile of aluminum sooner or later will have to be disposed of.

In looking to the future, the Bache analyst predicts that total supply and consumption will balance in 1961, and, continue to through at least 1965. Secondary metal and imports are predicted to gain in volume, but not in relative importance.

Probable consumption in 1965, according to Mr. Spector, will be about 4.4 million tons, compared with 2.7 million tons for this year.

Tin prices for the week: Oct. 19—103.125; Oct. 20—103.375; Oct. 21 — 103.25; Oct. 24 — 103.125; Oct. 25—103.00.*

* Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	30.00	33.00	10/11/60
Copper (CS)	30.00	31.00	10/13/60
Copper (L)	30.00	33.00	10/13/60
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium Ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; **Other primary prices, pg. 136.**

PRECISION is the watchword during every step in the manufacture of Blaw-Knox Rolls. This extra care at every step, maintained by constant close inspection, is your assurance of rolls having the exact properties, dimensions, and finish for maximum service in the stand.

Our rollmakers have more than a century of close association with the metal rolling industry in the development and manufacture of rolls to meet the most rigid service requirements.

Blaw-Knox Roll Engineers welcome the opportunity to join with you in selecting rolls of the proper grade and design for your operations.

Blaw-Knox Company, Foundry and Mill Machinery Division, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

BLAW-KNOX

ROLLS

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/4
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	54.13	.....	51.86	55.32
Brass, Yellow	48.77	49.06	48.46	52.43
Brass, Low	51.25	51.54	50.94	54.81
Brass, Red	52.12	52.41	51.81	55.68
Brass, Naval	53.58	59.89	47.14	57.24
Munts Metal	51.64	.....	46.70	.....
Comm. Bz.	53.53	53.82	53.22	56.84
Mang. Bz.	57.27	.....	50.71	.....
Phos. Bz. 5%	74.70	74.95	75.45	76.63

Free Cutting Brass Rod 34.48

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb)..... $1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $2.25
Iridium, dollars per troy oz..... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $208 to $210
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz...$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 28.25
- No. 120 ..... 27.25
- No. 123 ..... 26.25

80-10-10 ingot
- No. 305 ..... 32.75
- No. 315 ..... 30.50

88-10-2 ingot
- No. 210 ..... 40.50
- No. 215 ..... 37.25
- No. 245 ..... 32.50

Yellow ingot
- No. 405 ..... 23.50

Manganese bronze
- No. 421 ..... 27.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.25-24.50
- 0.60 copper max. 24.00-24.25

Piston alloys (No. 132 type)..26.00-27.00
No. 12 alum. (No. 2 grade)...22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.)...24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

(Effective Oct. 25, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 23.75-24.75
Grade 2—92-95% 22.50-23.50
Grade 3—90-92% 21.50-22.50
Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25⅜	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24¼
No. 2 copper wire	22¼
Light copper	20
*Refining brass	20¼
Copper bearing material	18½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	23¾
No. 2 copper wire	22¼
Light copper	20
No. 1 composition	19½
No. 1 comp. turnings	19
Hvy. yellow brass solids	15
Brass pipe	13½
Radiators	15⅝

Aluminum

Mixed old cast.	13 —13½
Mixed new clips	14½—15
Mixed turnings, dry	13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	21½—22
No. 2 copper wire	19½—20
Light copper	17½—18
Auto radiators (unsweated)	12½—12¾
No. 1 composition	16½—17
No. 1 composition turnings	15¼—15¾
Cocks and faucets	12¾—13¼
Clean heavy yellow brass	11¾—12¼
Brass pipe	13¼—13¾
New soft brass clippings	13½—13¾
No. 1 brass rod turnings	12½—12¾

Aluminum

Alum. pistons and struts	6½— 7
Aluminum crankcase	8½— 9
1100 (2s) aluminum clippings	10 —10½
Old sheet and utensils	8½— 9
Borings and turnings	4½— 5
Industrial castings	9 — 9½
2020 (24s) clippings	10 —10½

Zinc

New zinc clippings	7 — 7¼
Old zinc	4 — 4½
Zinc routings	3 — 3¼
Old die cast scrap	2 — 2¼

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	23-23.50
Clean Monel turnings	16.50-17
Old sheet Monel	22-23
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed.	15

Lead

Soft scrap lead	8 — 8¼
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	79 —80
No. 1 pewter	59 —60
Auto babbitt	43 —44
Mixed common babbitt	10¼—10¾
Solder joints	14½—15
Siphon tops	41
Small foundry type	9¾—10½
Monotype	9¾—10¼
Lino. and stereotype	8¾— 9
Electrotype	7½— 7¾
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M10*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1, T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

• Electro-galvanized-plus galvanizing extras.

(Effective Oct. 24, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25* lb. base box	Electro** *0.25* lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		
	Claymont, Del.												
	Conshohocken, Pa.												
	Harrisburg, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*	6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1,Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 C9						6.50 C9			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2,R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets.

(Effective Oct. 24, 1960)

†† 7.425 at Sharon-Niles is 7.225.

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*		7.50 *P2*	7.95 *P2*	
	Conshohocken, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Coatesville, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1, A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Oct. 24, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Parific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B.. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.,
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	7.87	9.71	10.16	10.78	8.44	9.13	8.65	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	16.76	.....	.....
Boston**	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.80	9.95	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.72	10.35	10.30	10.89	8.56	9.06	8.70	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	8.89	10.41	10.35	11.21	8.94	9.62	9.02	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.72[1]	10.03	11.39	11.01	8.80	9.45	8.81	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.98	10.61	10.65	11.26	8.93	9.62	9.01	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	9.65	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.70	10.45	9.55	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.13	10.20	.....	11.39	8.81	9.16	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	8.86	10.49	10.44	11.03	8.70	9.28	8.84	11.04	17.24	16.24	21.24	20.59
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia**	.10	8.45	9.70	11.50	10.95	8.80	9.05	8.85	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.72	10.03	11.28	10.99	8.56	9.06	8.70	11.40	17.10	16.10	21.20	20.45
Portland**		9.45	11.30	12.35	11.45	9.60	10.80	9.45	16.65	18.60	17.80	22.70	22.20
San Francisco**	.10	10.27	11.79[2]	11.50	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.92	10.75	10.68	11.09	8.77	9.29	8.92	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.84	10.99	11.16	8.83	9.33	8.97	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅜" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16"; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 8615—1⅝" to 2⅜"; cold drawn—15/16" to 2⅜" round; Hot-rolled 4140—⅝" to 2⅜" round, cold drawn—15/16" to 2⅜" round.

†† 13g zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Oct. 24, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
Se. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	72.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31 0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	2	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Oct. 24, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	43.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3,* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2,* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	...	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	*7.0	10.75	*2.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*6.25	.....	*2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*18.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

Rear-pump body for automatic transmission cast from gray iron using shell-molds and -cores.

modern shell-mold casting for:

IMPROVED ACCURACY

Size and location of the oil ports in the pump body illustrated are maintained within *a tolerance of 0.015 inch* by using shell-cores.

SMOOTHER FINISHES

Faithful reproduction obtained with shell-molds, and the absence of burnt-in sand reduce the amount of machining and finishing required.

GREATER RELIABILITY

Carefully controlled analysis plus precise heat-treating in our own modern facilities insure uniformly high quality and dependability.

OVERNIGHT DELIVERY WITHIN 500 MILES | to fill your IMMEDIATE NEEDS for QUALITY PRECISION CASTINGS at LOWER COST

GL GREAT LAKES FOUNDERS & MACHINE CORP.
LUDINGTON, MICH.

Specialists in Stack, CO_2, and Shell-Mold Casting

Let SUN SHIP solve your machine problem

When you need machine work or specially built machinery of any kind, you'll find Sun Ship qualified to do the job exactly to your specifications. We have machine tools of every size, and the facilities and skills born of long experience.

When you have a machining problem, write or phone

SALES ENGINEERING DEPARTMENT

Sun SHIPBUILDING & DRY DOCK COMPANY
CHESTER, PA.

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	33.25
0.05% C....	34.00	1.00% C....	33.00
0.10% C....	33.75	1.50% C....	32.75
0.20% C....	33.50	2.00% C....	32.50

3-5% C, 53-63% Cr, 2.5% max. Si.... 26.00
4-6% C, 58-63% Cr, 3-6% Si..... 22.50
5-8% C, 58-63% Cr, 3-6% Si..... 22.50
6-8% C, 50-56% Cr, 4-7% Si..... 22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
0.025% C (Simplex) 35.00
0.010% C max, 63-66% Cr, 5-7% Si. 34.50
0.25% C max 33.50
0.010% C max, 68-71% Cr, 2% Si max 34.50
0.25% C max 33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	24.50	14.60
Ton lots	29.75	16.05
Less ton lots	31.35	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	.. $98.00	$96.00	$100.50
19-21%	.. 100.00	98.00	102.50
21-23%	.. 102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	(Bulk) 37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe ..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb...	2.40	3.30	4.55

(Effective Oct. 24, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots, F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up $1.20
16 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb & over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

GUARANTEED—RE-NU-BILT

Electric Power Equipment — A. C. Motors

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1750	G.E.	M-8798S	4800	1800
1	800	Whse	CW	500	1776
1	300	G.E.	MT-428	2200	450
1	600	Whse.	CW	220/440	900
1	600	Whse.	CW-4-82D-15	440	1778
1	650	Whse.	CW	440	253
1	540	Whse.	CW	550	350
1	300	A.C.	ANT	440/2300	720
1	300	G.E.	MTP561	2200	1800
1	250	G.E.	IM-16	220/440	875
1	224	A.C.	ANT	550	600
1	250	Cr.Wh.	Size 29Q	2300	350
1	250	G.E.	MT-424Y	4000	257
1	200	G.E.	IE-18B	220	1800
2	300	Whse.	CW-800	2300	1775
1	200	G.E.	IM	440	435
1	150	G.E.	IM-17	440	425
1	300	G.E.	IM	2200	580
1	125	G.E.	MT-857	220/440	1200
8	100	A.C.		440	695
1	100	G.E.	M-8385Z	220/440	880

SQUIRREL CAGE

1	500	G.E.	FT-559AY	2200	3600
3	500	Whse.	CSP-583H	440	3600
1	500	Whse.	CS-1118	2200	863/445
4	500	Whse.	CS-1216	2200	500
2	450	El.	F-3910	2200	1200
1	400	Whse.	CS-7151 610H	6600/4000	3585
1	300	Whse.	CS-1002	2300/440	600
1	250	Whse.	CS-875S	2200	1775
1	200	Whse.	CSP-581S	440	3450
3	200	Whse.	CS-855S D.P.	220/440	1750
300/150		Whse.	CS-963H	2300	1175/878
1	150	G.E.	FT-556	2200	875
1	150	Whse.	CS	440	580
1	125	Whse.	CS-784C	220/440	1160
8	100	Whse.	CS-780C	2200/440	1160
1	100	Whse.	B.B.CS-607-220/440		1780

SYNCHRONOUS

1	6000	G.E.	ATI.8	200/6600	600
1	5000	G.E.	TS 1.0 4600/2300/4000		360
2	1750	G.E.	ATI	2300	3600
3	500	G.E.	TS-9600.8P.F.	2200	1200
1	400	G.E.	TS-7545	2300	1200
3	350	G.E.	ATI 1.0P.F.	2300	180
1	325	G.E.	ATI 1.0P.F.	440	1800
2	300	Hi Mach.	BERT	2200	1200

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Tel. OL 3-3334

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

SLIP RING MOTORS

3 Phase—60 Cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
1**	2500	Al.Ch.	ANY	2200	296
1**	1800	Whse.	Mill	2300	252
1**	1300	Whse.	CW	2200	444
1	700	Whse.	CW-1224	2200	600
1**	500	Al.Ch.	ANY	2200	505
1**	500	Al.Ch.	ANY	2200	293
1	400	Whse.	CW	2200	600
1*	400	Al.Ch.	ANY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	IE15-M	2200	1180
3	300	G.E.	IE15B-M	440	1200
1	300	Whse.	CW-1012	2200/440	720
1	250	Whse.	CW	4160/2400	710
1	250	Whse.	CW	2200	600
1	250	Cr.Wh.	Size Q	4600/2300	350
1	250	G.E.	MT-414	2200	300
2	200	G.E.	1-17-M	2200/440	600
1	200	G.E.	1-14-M	2200	490
1	150	G.E.	MT-564	2200/440	700
1	150	Whse.	CW	4160/2200	585
1	150	Whse.	CW-954	440	514
1	150	Whse.	CW-1000	440	435

*—Pedestal Bearings

**—Mill type with stator shifting base

SYNCHRONOUS MOTORS

3 Phase—60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	4200	G.E.	.90	13200/6600/ 4160	300
1	4500	Whse.	.80	4760	1200
2	1750	G.E.	1.00	2200	3600
2	1750	Whse.	1.00	4100	450
1	1500	Whse.	.80	2300	514
2	1450	Whse.	.80	4100	450
1	920	G.E.	1.00	440	300
1	700	El.Mchy.	1.00	440	220
1	650	G.E.	.80	2300/4000	1200
1	500	El.Mchy.	.80	2300/4000	720

FREQUENCY CONVERTING SETS

1—3000-KVA G.E. 300 R.P.M., 2300-Volt, 3 phase, 25 cycle with Syn. Motor, 3600-HP, .90 P.F., 13200/6600/4160-Volt, 3 phase, 60 cycle, with exciter and complete starting equipment.

1—460-KVA G.E. 300 R.P.M., 440-Volt, 3 phase, 25 cycle and Syn. Motor 500-KVA, .80 P.F. 440-Volt, 3 phase, 60 cycle, exciter and Starting Equipment.

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Phone: Davenport 4-8300

THE CLEARING HOUSE

Farwest Activity Has Two Sides

Used machinery dealers on the West Coast are in disagreement over the business situation. Some say "good"; others yell "bad."

Nevertheless, those that have the machinery and go after sales are profiting.

■ Some used machinery dealers on the West Coast say business is "not too bad." Others, however, say "it's not too good."

One dealer, who recently purchased a raft of equipment from American Can Co., is almost elated. He scoffs at other dealers, contending that business is there if the right machinery is on hand.

The right equipment, he says, is the "moderately old" punch presses and the few milling machines his company bought as surplus from Canco.

"We bought about 145 punch presses. We can sell them at attractive prices and still make a profit." The price? "About 50 to 60 pct of equivalent new equipment."

A Good Outlook — While some customers prefer to recondition this equipment, most want it on an "as-is" basis, he reports. Now bolstered by an array of merchandise on hand, most of which is in demand, this dealer says the outlook for the rest of the year is good. He also feels business will be good during the early months of 1961.

Milling machines, lathes and punch presses are his leading movers at the present time. Despite the age, customers demand quality, he notes.

The Other Side—But on the other end of the outlook range is a dealer who talks as though business will never crawl from its deep hole. He complains, "New orders are coming in slow and inquiries have almost dried up."

However, despite this pessimism, the dealer does see one bright spot: "Foreign machinery isn't selling as well because deliveries are slow."

He challenges reports that large companies are not cutting back on capital spending. "They may still have those plans on paper, but they sure aren't putting them into action."

In his particular case, fabricating equipment — shears and presses — are the only items selling. "And there's not much movement in these."

The Future — What's ahead? "I don't see anything in the near future that will change things. We just have to get out and beat the bushes for sales."

In the middle of this picture is a leading area dealer who terms present conditions as "all right." While business is not nearly as good as last year, he argues that it is to be expected. His company had a top year in 1959. He says there are many inquiries for equipment not more than 10 years old. The problem is locating this machinery.

Among his better movers are engine lathes, good, clean milling machines, drilling machines and grinders. He claims, "machinery that's more than 10 years old will bring only about one-half what it would one year ago."

RAILWAY EQUIPMENT

USED and RECONDITIONED

RAILWAY CARS and REPAIR PARTS

14—50-Ton Capacity, All-Steel
BOX CARS
Immediate Delivery Excellent Condition

DIESEL-ELECTRIC LOCOMOTIVES

1, G. E. 25-Ton, 150 H.P., Std. Ga.
3, G. E. 44-Ton, 400 H.P., Std. Ga.
1, G. E. 80-Ton, 500 H.P., Std. Ga.
1, BALDWIN, 120-Ton, 1000 H.P., Std. Ga.

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ROLLING MILLS—STEEL WORKS EQUIPMENT

1—35" 2-HIGH BLOOMING MILL, with reversing motor, M.G. set, tables, manipulator.
1—3-HIGH PLATE MILL 40" & 26½" x 112".
1—34" & 22" x 112" PLATE MILL, 3-high.
1—32" & 20" x 56" 3-HIGH SHEET MILL with motor driven screwdown and pre-set controls.
1—25" & 42" x 66" HOT STRIP MILL, 4-high.
1—18" x 29" COLD MILL, 2-high, 200 HP drive.
1—26" COLD SHEET MILL TRAIN, 6 stands, 400 HP motor and drive.
1—16" x 24" STRIP MILL, 2-high, forged rolls.
1—3½" & 8½" x 5½" STRIP MILL, 4-high.
1—16" BAR MILL, 3-high, single stand.
1—9" BAR MILL, 3-high, five stands.
1—34" x 192" ROLL GRINDER.
1—450 TON DOWN-CUT CROP SHEAR, 14" stroke, length of knives 28".
1—VERTICAL OPEN-SIDE BAR SHEAR, 28" knife, capacity 1" x 24" or equal.
1—HYDRAULIC DIVIDING SHEAR, capacity 5" x 5¼" hot steel.
1—SHEAR, 1" x 110" plate.
2—SQUARING SHEARS for ¼" x 156" sheets.
2—SQUARING SHEARS for 10 ga. x 120" sheets.
1—ROLLER LEVELLER, 1" x 144" plate.
5—LEVELLERS for sheets, 17 rolls, widths 48", 54", 66", 72".
1—AUTOMATIC SQUARING SHEAR UNIT for sheets, 162" side cut, 72" end cut.
1—UP-COILER for non-ferrous strip, up to 90" wide.
1—ROLL LATHE, ENCLOSED HEADSTOCK, up to 40" dia. rolls.
1—BILLETEER, size C, for conditioning billets from 3" to 12" square, up to 18' lengths.
1—MAGNETIC SEPARATOR, double pulley, Stearns.
1—SLITTER FOR SHEETS up to 144" wide.
1—SIDE TRIMMER for non-ferrous sheets ¼" thick up to 106" wide.
1—CORRUGATING MACHINE for sheets 144" long, 3 sets of removable dies.
1—HALLDEN STRAIGHTENING AND CUTTING-OFF MACHINE, capacity 5/16" to ⅝" dia. x 14 ft.
1—POINTER, tube 2" O.D. x ¼" wall maximum.
1—1500 HP GEAR DRIVE, ratio 8 to 1.
1—1200 HP GEAR DRIVE, 295 to 30 RPM.
1—1200 HP GEAR DRIVE, 353 to 94.5 RPM.
1—600 HP GEAR DRIVE, 1.696 to 1 ratio.
1—400 HP GEAR DRIVE, 8.2 to 1 ratio.
1—1500 HP MOTOR, 2300 volts, 3 phase, 60 cycle, 240 RPM.
1—600 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR, 440 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR, 2300/4600 volts, 3 phase, 60 cycle, 450 RPM.
1—400 HP MOTOR, 2200 volts, 3 phase, 60 cycle, 360 RPM.

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HANNIFIN HI-POWER HYDRAULIC UNITS
MODEL J.B.

1—200 Ton, w/340 gal. Reservoir
4—150 Ton, w/255 gal. Reservoir
4—100 Ton, w/170 gal. Reservoir

Vertically Mounted 3 Phase Motors, 1000 to 5000 P.S.I. with Intensifiers, Late Models. Further Information On Request.

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IMMEDIATELY AVAILABLE
Because of Mill Consolidation
3 LEE WILSON RECTANGULAR BELL-TYPE ANNEALING FURNACES

atmosphere-controlled with 9 bases, are available. Each is approximately 7' x 7' x 14' Excellent when used for manufacture of steel coils, they have a capacity of 50 tons per charge. These top-grade furnaces are still set up in the plant. Tremendous values specially priced for prompt sale.

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126 Mott St., New York 13, N. Y.
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One new Electric Arc Furnace Charging Bucket Including Bale

Type: Cable Operated—Clamshell

Capacity: 1486 Cu. ft=55 tons

Max Dia Closed: 17'-9"

Max Dia Opened: 18'-8"

Max Dia Bottom Opening 12'-6"

Distance from Eye of Bale to Bottom of Bucket Open and Closed: 14'-0"

Weight: 48,000 lbs

BOX H-108
c/o The IRON AGE, Chestnut at 56th, Phila. 39

BAR STRAIGHTENER
KANE & ROACH

Capacity ⅝" to 3½" Solids
Mfd. 1943 — 30 to 150 FPM.
Timken Bearing — All Steel Construction
Direct Drive to Gearcase — 75 H.P. M.D.
Weight 41,000# — Excellent Condition

In Stock—Immediate Delivery

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TRACK & SWITCH MATERIALS

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24" Model M—actual swing 24½" swing, 264" cc Monarch, m.d., late
24"x106" Meuser Gap Lathe, m.d.
25"x120" Boye & Emmes, vee belt, m.d.
25"x50"x8' cc LeBlond Gap H.D. Sliding Bed, m.d., hard ways
27"x96" cc American H.D., m.d., late
27"x120" cc LeBlond, m.d., 1944
30" Model NN x 60" cc Monarch, m.d.
30"x136" LeBlond, m.d.
36"xx30' cc (maximum 30'8" Niles "Time SaSrer", m.d
36"x144" cc Wickes Quick Change 3 step cone pulley belt drive
36"x31' 5½" centers Lodge & Shipley Selective, m.d.
48"x41' cc Niles Internal Geared H.D., m.d.
48"x108" cc American, m.d., 1942
48"x32' cc American H.D. Internal Geared Head, m.d.

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No. 1 LeBlond Automatic Turbine Wheel Lathe, Hydra-Trace Attachment, m.d.
4x60" LoSwing, m.d.
11x18" LeBlond Rapid Production, m.d.
12x12" cc Model 5T Monarch, m.d.
12x18" Reid Small Piece Production, Model 6WSL, m.d.
14"x21' centers Model LS Semi-Automatic LoSwing, m.d.
Model U, 14"x24" centers LoSwing, m.d.
17"x75¾" LeBlond, m.d.
20"x25" Jones & Lamson Fay Automatic Lathe, 1944
No. 3 Lodge & Shipley Duomatic, m.d., late type
No. 3A Lodge & Shipley Duomatic, m.d.
No. 8 Sundstrand Auto. Stub. m.d.
No. 9, 12 LeBlond Multi-Cut, m.d.
No. 12 Sundstrand Automatic Production, m.d.
No. 12 Gisholt Auto. Production, m.d.
No. 16 LeBlond Automatic, m.d.
Lipe Semi-Automatic Carbo Lathe, m.d.
Colburne Mfg. Bench Type Speed Lathe, m.d.
Model NA2B Schauer Speed Lathe
No. 9WSL, Reid Production, m.d.
36" Wickes Center Drive Tracer Lathe, md., 1953
60" Lodge & Shipley "T" Lathe, 2 carriages, copymatic tracer

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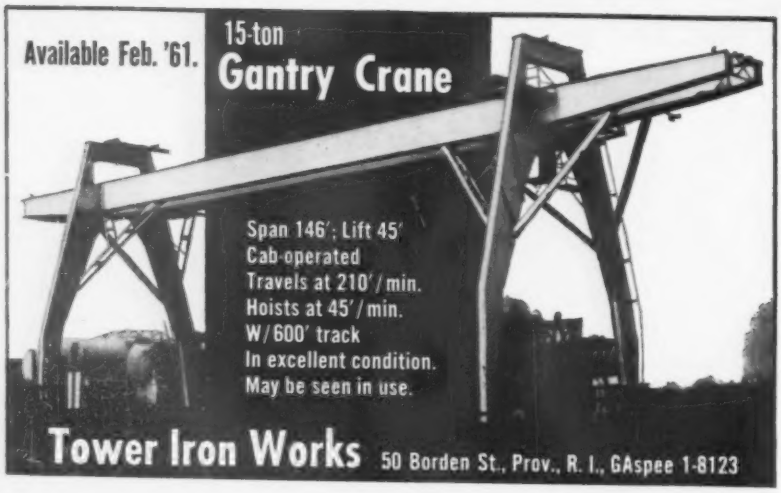
15-ton
Gantry Crane



Span 146'; Lift 45'
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Travels at 210'/min.
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In excellent condition.
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LATE MODELS—MONEY BACK GUARANTEE

2000 Ton Clearing Hydr. Press 56"x72", 250 HP, '43
1500 Ton Verson KJ Coining Press, Air Clutch, '43
1300 Ton Nat'l "Maxipres" 10" Str. Air Cl. '55
920 Ton Bliss-Tol. #60, 47"x72", Str. 20" Air Cl. '43
700/390 Ton Tol. 797E DA Tog. 127½x83" Bed
600 Ton Ferracute #E60I KJ Coining Press '50
440 Ton Bliss #210, Side Shear, Air Cl. Str. 18", '53
440 Ton Toledo #59½, 41"x48", Str. 12", Air Cl.
350 Ton Bliss 4C-7 Bed 136"x89", Air Clutch
150 Ton Cleve. 60-D-84, Bed 86"x46", Str. 14"
3000 lb. Chambersburg #30CD "Ceco Drop" Hammer

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1957C CLAY — TR 2-1270 — DETROIT 11, MICHIGAN

Useable Hough HA Payloaders and LA-40 Trojan Loaders from $995.00 to $3,500.00
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RAIL AND TRACK MATERIAL
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BOILERS—COMPRESSORS
80,000#—250 P.S.I. Boiler Plant, complete, like new.
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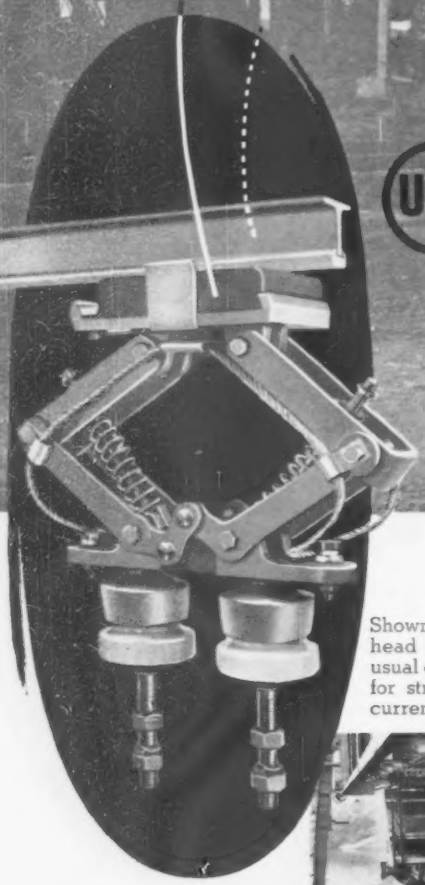
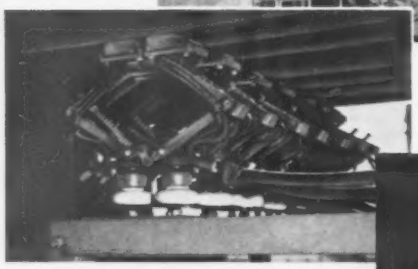


Shown below are the copper-head steel rails. These unusual conductors feature steel for strength and copper for current capacity.



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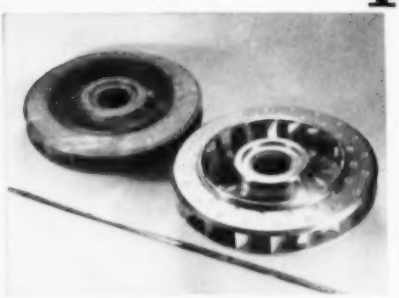

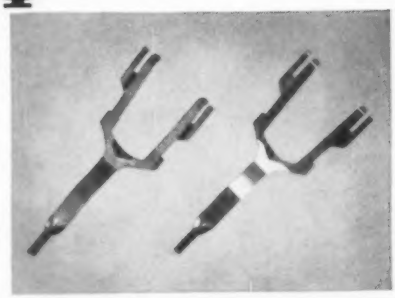
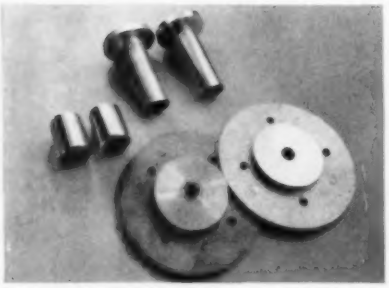
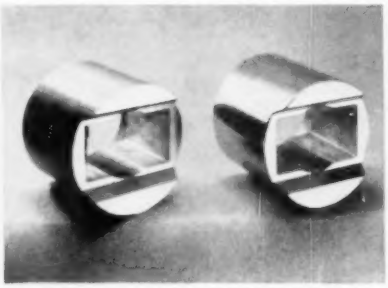
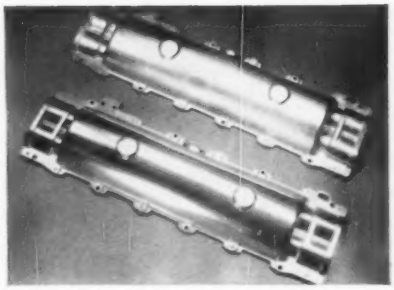

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